

COMPUTERWORLD

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APRIL 7, 1986

VOL. XX, NO. 14

TOP OF THE NEWS

A humbled Encore Computer Corp. focuses on new goals. **Page 126.**

A programming error led California officials to underestimate future revenues by nearly \$400 million. **Page 2.**

Floating Point Systems unveils a new supercomputer using a hypercube architecture and promises a 60-GFLOPS machine in 1987. **Page 13.**

Multivendor network management may soon be possible, if a rumored IBM campaign for standards is pursued. **Page 19.**

A manufacturing concern opts for a supermini network that delivers triple the performance of a similarly priced supermini computer. **Page 28.**

DEC will announce today the VAX 8500, a general-purpose uniprocessor that fits between the recently announced VAX 8800 and the VAX 8600 system. A DEC spokesman ruled out rumors of a high-end Microvax-type product. Analysts say the system will be a uniprocessor version of the VAX 8800 dual-processor system and that it will be the first VAX without a Unibus and therefore smaller than existing VAXs. *

Lincoln D. Faure, former director of the U.S. National Security Agency, has been tapped as president and chief executive officer of the Corporation for Open Systems, the nonprofit organization will announce today. Faure brings to COS "experience in managing highly technical organizations" and can represent COS "at the highest corporate and government levels," said COS Chairman Thomas Lyman Chun. *

British personal computer manufacturer Apricot, Inc.'s U.S. operations will be acquired this week by "an American entity," a source close to the firm reported. Although the firm making the acquisition was not disclosed, the source said the

See NEWS page 8

Wang aims at Microvax II

Deskside 32-bit units seen replacing VS 15

By Donna Raimondo

LOWELL, Mass. — In a move to edge its chief low-end competition out of the limelight, Wang Laboratories, Inc. last week released two powerful 32-bit deskside systems. Wang spokesmen said that the systems can process a mixed load of programs up to four times faster than Digital Equipment Corp.'s Microvax II.

Wang's new suitcase-size VS 5 and VS 6 machines, priced at \$12,000 and \$19,950, respectively, are software-compatible with the company's other VS series machines. The systems are targeted to small businesses, departmental processing and

See WANG page 12

MVS gets own expert system

By Rosemary Hamilton

RYE BROOK, N.Y. — Amid the flurry of micro announcements last week, IBM also quietly introduced an expert system tool to run under MVS. The tool is the first artificial intelligence product IBM has developed for that mainframe operating system.

"These products are important because they show IBM's commitment to AI and its desire to have expert systems developed on the 370 architecture," said Scott Smith, a vice-president with the Gartner Group, Inc., a market research firm in Stamford, Conn.

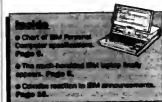
The Expert System Environment/MVS
See MVS page 4

IBM unveils Convertible, PC upgrades

By Eric Bender

NEW YORK — IBM's long-awaited PC Convertible laptop finally rolled into the spotlight last week, accompanied by more than 40 other Personal Computer offerings.

But while the product activity held center stage at IBM's Manhattan offices, industry analysts were more impressed by Entry Systems Division President William Lowe's remarks on IBM's intentions to flex its manufacturing and technological muscle. "Compatible manufacturers," Lowe



said, "will now have to move quickly to remain compatible." He later expanded on these remarks in an exclusive *Computerworld* interview (see story page 8).

The technical star of last week's show was the PC Convertible, a 12-lb, \$1,995 microcomputer that is the first IBM system equipped with 3 1/2-in. disk drives to be sold in the U.S. The following announcements were made at the same time as the laptop debut:

- A faster Personal Computer AT.
- Enhanced models of the Personal Computer XT.
- Several new versions of the 3270 Personal Computer.

See IBM page 6

CW EXCLUSIVE

Stock option: Broker taps service bureaus for records management

By Elizabeth Horvitt

Our corporate culture evolved in such a way that management has always felt comfortable letting others take care of things not directly related to investment management," says George S. Goodman, vice-president of information systems at T. Rowe Price Associates, Inc. "It's unusual to have a financial service firm our size do as little in-house processing as we do."

The Baltimore-based investment firm, which manages and makes investments decisions for more than \$21 billion in client assets, decided early on to farm out most of its data management chores, including the maintenance of sharehold-

er records, to the remote data processing facilities of banks and service bureaus around the country.

According to Goodman, T. Rowe Price's reliance on remote service providers has helped the company stay competitive in the fast-moving, deregulated investment market, success often depends on developing new financial applications in time to take advantage of rapidly closing market windows.

"It's often more expensive to develop a new application in-house than to buy it from someone else," Goodman says. "But the key factor is the time limit we often face. We have a finite

staff. Given the short lead time in our business, we can't gear up fast enough to provide a new service if we have to do everything ourselves."

Going with outside providers has given T. Rowe Price the crucial capability of moving fast when a new market opens up. It also has kept the investment house's data processing expenditures unusually low. "Investment houses like Merrill Lynch, Pierce, Fenner & Smith, Inc., a major portion of whose business consists of managing thousands of individual retail accounts, usually have multimillion-dollar computer installa-

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NEWSPAPER

NEWS

Bug in DMV program causes shortfall in revenue projection

Understated reports mar California budget

By Jeffery Bowler

SACRAMENTO, Calif. — State officials last week identified a Department of Motor Vehicles (DMV) programming error as a prime reason that the California state government recently underestimated future revenues by nearly \$400 million.

The bug resided in a program that produces monthly statements of the DMV's vehicle registration and driver's license transactions. The misce apparently occurred 21 times before its cause was uncovered by programmers last October. It was made public for the first time last week during preparations for legislative hearings into DMV systems problems.

Because of the bug, sources said, the DMV had unknowingly supplied the state finance department with monthly transaction volume reports that were greatly understated. During the five months ending June 1985, the undercount totaled about 899,000 transactions, according to a non-DMV source who asked not to be named.

The program in which the bug resided was prepared to help the DMV track the number of vehicle registrations and license renewals. In theory, the program is supposed to add the daily totals to its master file, which updates its records to produce a cumulative, month-to-date count of the DMV's transaction volume.

According to standard state accounting procedures, the DMV sends its monthly transaction volume figures to the California Department of Finance, which include the numbers in its estimates of state collections and disbursements for the coming fiscal year.

But because the DMV transaction counts were artificially low, the finance department's final financial projections turned out to be about \$400 million more modest than they would have been otherwise, the non-DMV source said.

The faulty projections were traced to a programming glitch hidden in the DMV software, which sometimes prevented the updating procedure from working as it should. Between February and June 1985, the error prompted the program "to randomly reset its month-to-date transaction totals to zero," according to a DMV systems professional who also requested anonymity.

The existence of the troubleshooting program error was first suspected last October when state officials began noticing an abnormally low vehicle registration rate that they could not explain.

At first, the sluggish level of activity was thought to stem from the DMV's large backlog of unprocessed registrations. But after reviewing all the pertinent records in its Sperry Corp. 90/80-based system and manually reconstructing its transactions, the DMV traced the discrepancies to the programming error, the non-DMV source said.

Linium charges John Hancock with piracy, seeks \$25 million damages

By Douglas Barway

RAY HARBOR ISLANDS, Fla. — A suit alleging software piracy by John Hancock Mutual Life Insurance Co. and seeking \$25 million in punitive damages was filed last week by Linium Technology, a wholly owned subsidiary of American Software Technology, Inc.

The suit, filed in the U.S. District Court for the Southern District of Florida on March 27, alleges that John Hancock officers, agents and employees illegally copied and used Linium's \$240 Mortgage Accelerator sales and marketing software.

Specific allegations include copyright infringement, trade secret misappropriation, unjust enrichment and breach of a license agreement. The \$25 million figure is for punitive damages, according to Linium attorney Robert M. Schwartz, who specializes in patent, trademark and copyright law.

According to a source close to Linium, the violations were discovered when various John Hancock employees called Linium for support questions and each used the same product code number. "That was the giveaway," the source said.

According to Linium, a California-based regional vice-president of John Hancock initiated the violations of

Linium's copyright, and those violations spread elsewhere. "The allegations were not made directly against John Hancock headquarters in Boston. They were made against a regional vice-president on the West Coast," said James A. Heaney, a spokesman for Linium.

John Hancock refused to confirm whether any software copying had occurred. "It is being investigated," said Tom Keating, manager of product marketing publicity for John Hancock.

John Hancock filed suit in the U.S. District Court for the District of Massachusetts on March 14, nearly two weeks prior to the Linium suit, challenging the validity of Linium's copyright. "Apparently there had been correspondence between the companies, and in order to resolve the issue once and for all, John Hancock elected to initiate suit," Keating said.

"The suit seeks to challenge the validity of the copyright by alleging that the software program in question 'does not embody subject matter copyrightable under the copyright laws of the United States,'" Keating said. "We feel that the Linium suit has no basis."

Linium will seek to have the John Hancock suit dismissed or transferred to Florida.

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EXECUTIVE REPORT



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Even though master programmers may be born, not made, there are lessons that the rest of us can learn from them. In this week's Executive Report, Computerworld interviews four superprogrammers who talked about creativity, personal style and excelling as a programmer in 1986. By Jeffery Tarter/41

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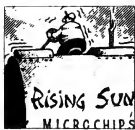
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MSA to buy software vendor

By James A. Martin

ATLANTA — Management Science America, Inc. (MSA) said last week it has agreed in principle to acquire RTS Ltd., a Dublin-based vendor of manufacturing and financial software for IBM's System/36 and System/38 minicomputers.

The acquisition marks MSA's first move into minicomputer software and will strengthen the company's position both domestically and internationally in manufacturing and accounting software, according to Larry Smart, MSA senior vice-president of development.

"Many manufacturers today are looking for departmental computers for distributed processing, so they can take some functions that would have otherwise been on the mainframe and download it to a System/36 or 38," Smart said. "We didn't have any experience in software on

minicomputers, and this acquisition will give us substantial expertise in the System/36 and 38 marketplace, especially in manufacturing and financial applications."

RTS will become a subsidiary of MSA, and its products will continue to be marketed by its own sales force in the U.S. and overseas. Smart said. MSA will work with RTS to develop a level of integration between RTS software for minicomputers and MSA's mainframe software. "This will help us develop some distributed applications for our manufacturing customer base," Smart added.

MSA had been looking to move into minicomputer software to complement its mainframe programs. "Our customers have been looking at those kind of alternatives to any of their processing needs," Smart said.

MVS gets own expert system

From page 1

was announced with a number of other mainframe programming and application packages last week. The product is similar to the expert system announced last year for IBM's VM operating system (CW, Aug. 19) and is composed of a pair of complementary programs — the Expert System Development Environment/MVS and the Expert System Consultation Environment/MVS — that allow users to create knowledge-based applications.

While acknowledging that the expert system tool is an important announcement, Harvey Newquist at "AI Trends," a newsletter published by DM Data, Inc. of Scottsdale, Ariz., considers it no more than a "cursor nod" from IBM.

"The only reason why they're offering this is so their customers won't go somewhere else for it," he said. "They never put AI products unless people ask for it. All their AI announcements have been low key and lost in the shuffle. The AI market still isn't big enough for them to do

anything aggressively."

The programs, which are currently available, can be licensed on a monthly basis or with a one-time charge. The Consultation Environment has a one-time fee of \$25,000, or it can be licensed for \$1,250 per month. The Development Environment has a one-time cost of \$35,000 or \$1,750 per month.

The Development Environment allows users to build a knowledge base on a particular subject or area of expertise. The Consultation Environment allows users to request advice or information that has been established by the first program.

Users cannot operate the Development Environment without the Consultation Environment; to test features built into the Consultation Environment, once a knowledge base has been built, the Consultation Environment can be used alone.

While developing a knowledge base, users create the rules, parameters and control blocks that will make up the expert system. A built-in editor checks semantics while information is being entered.

When consulting the system, users have the ability to search backward for supporting data of a fact or to start with the fact and build it. The techniques are known as forward- and backward-chaining inference

Lotus cuts price of Jazz

CAMBRIDGE, Mass. — Lotus Development Corp. last week announced shipment of Jazz Release 1A and dropped the package pricing from \$595 to \$395.

The move marks the first price cut for a mainstream Lotus product. By general industry consensus, the micro software firm has not met its sales expectations for Jazz, a five-function package for the Apple Computer, Inc. Macintosh.

Release 1A, announced in January and tailored for the Macintosh Plus, is said to offer faster disk access, hard-disk support and the ability to access IBM-style random-access memory. It also provides faster Laserwriter printing and support for the Macintosh's new hierarchical file system.

methods. There is also an explanation facility to find out why a rule or parameter was established.

Both programs include debugging tools, a feature to build customized displays and a function to break down problems into subproblems.

Users will be "playing around"

Initially, both Newquist and Smith expect users mainly to experiment with the product rather than develop anything substantial. "They'll be playing around more than anything else," Newquist said. In fact, he said the cost of the packages "show that the pricing was not designed to sell a lot, but was designed for users who really want it."

Other software announcements made last week were the Personal Services/370, Release 2; and the VS Fortran, Version 2, Release 1.1, Compiler, Library and Interactive Debugger. The company also said two previously announced products — the Document Management/VSE and the File Transfer Program, Version 2, Release 2 for VM — are now available.

Personal Services/370, Release 2, which works in conjunction with IBM's Distributed Office Support System (Diosas)/370, operates as a CICS/VS application. The product provides a variety of either new or enhanced automated office features from Release 1, including a redesign of the user interface, support for Displaywriter/370, automatic delivery of incoming mail and additional print capabilities. Personal Services/370, running under MVS/370 or MVS/XA, has an initial license fee of \$2,400 and a monthly fee of \$800. A version running under VSE has an initial charge of \$1,125 and a monthly charge of \$375.

IBM said a capability that will allow Personal Services/370 to operate in a remote CICS/VS environment will be available in the first half of 1987. This would allow users to run the software under a CICS that is separate from that of the Diosas/370 in the same or a different processing facility.

The VS Fortran, Version 2, Release 1.1, Compiler, Library and Interactive Debugger includes support of the IBM 3090 Vector Facility. It reportedly allows a programmer to specify segments of a program to be vectorized.

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NEWS

IBM unveils PC Convertible

From page 1

- Three-and-one-half-in. disk drives for some models of its PC line.
- An upgrade of the Topview operating environment that handles program swapping.
- Communications software enhancements.

- A new keyboard designed as a standard for IBM office systems.
- Price cuts of up to 25% on many PC hardware products.
- Price increases on mainstream micro application packages.

Analysts generally gave good initial marks to the new laptop machine and the other product debuts. But the introductions mostly represented "a lot of catch-up announcements," said office systems consultant Amy Wohl of Wohl Associates.

Corporate users, meanwhile, expressed much interest in the new portable but lacked any plans for significant purchases. They also expressed some reservations about supporting a new 3/4-in. media format.

The new Personal Computer AT comes with an 8-MHz Intel Corp. 80286 CPU, one-third faster than earlier models, and internal memory that can be boosted to 10.5M bytes with new expansion options, IBM said. Available now, a configuration with 512K bytes of internal memory, 30M-byte fixed disk drive and 1.2M-byte diskette drive costs \$5,295. A new version of the Personal Computer AT/370 with similar features will cost \$8,995.

In a move seen as another mid-life kicker for the PC XT family, three new models were introduced, featuring half-height floppy disk drives, the ability to install 640K bytes of internal memory on the system board, which saves expansion slots for other uses, and an optional 20M-byte hard disk drive. Starting costs range from \$2,145 to \$2,895.

IBM also unveiled eight 3270 Personal Computer models, with storage and processor features corresponding to the new high-end XT and AT offerings, and a new release of the 3270 PC Control program. System prices range from \$3,860 to \$7,245. 3270-PC models will be available in

the second quarter and 3270 PC AT models in the third quarter.

Most 3270 PCs support the new Expanded Memory Adapter, a bank-switching option that provides up to 2M bytes of random-access memory within the PC-DOS 640K-byte direct-address limitation. The adapter permits the system to support up to six PC-DOS sessions and four host sessions concurrently. The 1M-byte adapter costs \$1,830; expansion requires a \$365 module kit and \$290 256K-byte expansion options.

Topview 1.1, priced at \$175, swaps programs into memory from fixed disk drive or virtual disk, said Leland Reiswig, IBM systems manager, communications/office systems software. "The time to swap a 256K-byte program is less than two seconds." This expanded-memory approach is incompatible with the 3270-PC's new option and with the Lotus/Intel/Microsoft Expanded Memory Specification.

The new software also links up with IBM's mainstream micro communications software, he said.

Before last week's announcements, IBM offered "a lot of communications programs that were incompatible with other strategic programs for the PC," Reiswig pointed out. IBM introduced several software enhancements designed to relieve this situation and designed particularly to allow Topview, local-area networks and 3270 host-access software to play together more smoothly.

Along with the new 3270-PC offerings, two PC 3270 Emulation Programs represent a significant step toward fulfilling IBM's Oct. 1984 statement of direction for providing IBM PCs with access to the Distributed Office Support System environments, according to Lowe.

Replacing existing 3278 and 3279 emulation software, the two new offerings are compatible with Topview 1.1 and the IBM Local Area Network Program Version 1.1.

Functions of the \$185 PC 3270 Emulation, Entry Level Program include improved data transfer to and from IBM hosts, host attachment while concurrently running a PC-DOS program and attachment to hosts through a 3274 controller or via Synchronous Data Link Control while emulating a 3274. Among other functions, the \$425 3270 PC Control Program Version 2 expands gateway

IBM Personal Computers					
	PC AT	PC AT/370	PC XT	3270 PC	3270 PC AT
Display System	5	5	4.77	4.77	5
Memory (bytes)	512K-10.5M	512K-10.5M	256K-640K	512K-2M	640K-2M
Storage	1.2M-byte floppy disk and 30M-byte hard disk	1.2M-byte floppy disk and 30M-byte hard disk	Single or dual 360K-byte floppy disk and 30M-byte hard disk	Single or dual 300K-byte floppy disk and 30M-byte hard disk	1.2M-byte floppy disk and 30M-byte hard disk
Micro-processor	Intel Corp. 80286	80286	Intel 8088	8088	80286
Price	\$5,295	\$8,995	\$2,145	\$3,995	\$7,145
Options	External 3 1/4-in. 720K-byte floppy disk drive	External 3 1/4-in. 720K-byte floppy disk drive	Internal or external 3 1/4-in. 720K-byte floppy disk drive	Enhanced keyboard, 20M-byte hard disk drive, 360K-byte floppy disk drive	30M-byte hard disk drive, 360K-byte floppy disk drive

connectivity for PCs on the Token-Ring net or PC Network with the ability to run gateway and net server software on the same machine.

In a related move, IBM introduced the 3270-C High Level Language Application Program Interface (API) Version 3, a subset of the 3270-PC API designed to aid developers creating PC-DOS applications that work with large system programs.

The new \$125 Local Area Network Program Version 1.1 is the renamed PC Network Program, reflecting support of the Token-Ring network as well, with Topview and 3270-PC software compatibility.

The Enhanced Personal Computer Keyboard will become a standard for future PCs and other office systems, Lowe said. Very similar to the RT Personal Computer's keyboard, the 101-key design separates the typing area, calculator-style keypad and cursor and control keys and places function keys across the top. IBM will continue to offer earlier keyboards as an option for some models, but the new keyboard does not work with the earlier models, Lowe said. IBM's hardware price cuts particularly affected hard-disk models, and analysts suggested that the moves responded to heightened competition from low-cost clone manufacturers and third-party drive vendors.

The greatest change affected a

standard PC XT with 256K bytes of internal memory, one floppy disk drive and 10M-byte hard disk drive, with cost slashed from \$3,895 to \$2,895. Among other changes, price of a PC AT with 30M-byte hard disk drive fell from \$5,995 to \$5,295, and the cost of a dual-floppy PC AT slid from \$2,295 to \$1,995.

Some memory and disk components also dropped dramatically. Among these, cost of a 512K-byte memory option for the PC AT slipped from \$1,125 to \$295, and the 20M-byte hard disk drive was cut from \$1,595 to \$1,095.

IBM, however, raised pricing on each of its best-selling Personal Computer Assistant series by \$16 and also assisted pricing upwards on its Personal Decision series and Business Management series.

As usual, a plethora of other products were also announced by Big Blue.

Among these, IBM released an \$429 enhanced version of the Topview Programmer's Toolkit; the \$495 Graphics Development Toolkit 1.1, which supports faster graphics and is compatible with Topview 1.1; and Mainframe Communications Assistant Version 1.05, a host asynchronous communications package that now supports 3/4-in. disks.

Senior writer Douglas Barnack contributed to this story.

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Emulex barred from DSA use

COSTA MESA, Calif. — Storage controller manufacturer Emulex Corp. said a court injunction preventing it from working on any products incorporating Digital Equipment Corp.'s Digital Storage Architecture (DSA) technology will not affect sales of its existing product line.

Last week, U.S. District Court Judge Martin Loughlin of New Hampshire issued a preliminary injunction preventing Emulex from "designing, developing, manufacturing, marketing or selling" products that incorporate or connect to any protocols specified in DEC's DSA, unless the development and testing of the product was completed before June 21, 1986. Approximately 75% of Emulex products are sold into the DEC marketplace.

According to Michael Lewis, Emu-

lex's chief financial officer, the injunction relates only to unannounced products and will not affect sales or revenue projections for the upcoming fiscal year.

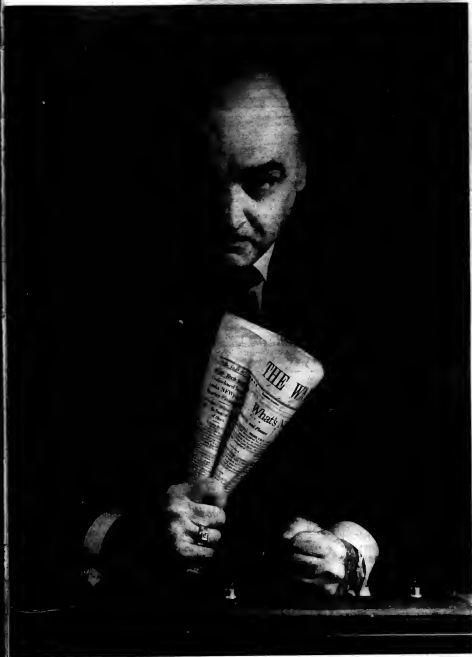
Analysts predict the \$103 million company will earn between \$1 and \$1.25 per share for the fiscal year ending June 30, 1987.

Last year, DEC charged Emulex and former senior engineer Charles Hess with misappropriation of trade secrets after Hess left DEC to join Emulex in July. Last week's injunction prevents Emulex from employing Hess in any capacity related to DEC-compatable products or disclosing information about DEC that Hess took with him to Emulex. Hess left Emulex in January, Lewis said.

Emulex plans to appeal the suit.

— Maurine McNamee

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NEWS

Users, analysts express mixed reactions to PC Convertible

Weak laptop demand, use of LCD screen are among drawbacks cited

By Douglas Barney

NEW YORK IBM's long-rumored PC Convertible lap-size machine was introduced last week to analysts and large corporate users who generally expressed uncertainty about the product's chances for success.

The 12-lb PC Convertible, with a base price of \$1,995, features dual 3½-in. floppy disk drives, 256K bytes of random-access memory (RAM) that can be expanded to 612K bytes and a detachable LCD screen, claims that the Convertible typically will run for between six and 10 hours on a battery pack.

Industry consultants pointed out that a system configured with a modem and other likely options such as a serial/parallel adapter will run closer to \$3,000 (see chart). Some also noted that, although IBM is positioning the machine as a combination desktop and portable unit, no hard-disk options are supported.

"It looks like a good portable product, but I'm not sure what the market is for portables," said Barbara Isgur, an analyst and vice-president of D. H. Brown Associates in Tarrytown, N.Y.

Some large corporate users also expressed caution. "We have not had anybody knocking on our doors saying they wanted more portables or luggables or anything like that," said Roy Hill, chief systems programmer for Blue Cross/Blue Shield.

"I think IBM missed the chance to sell the laptop standard. Everyone's waiting for them as long as they

IBM PC Convertible	
Standard Configuration \$1,995	
Storage	Dual 720K-byte 3½-in. floppy disk drives
Weight	12 lb.
Power	Battery pack, AC adapter
Option Costs	
Monochrome composite video display	\$180
CRT display adapter	\$325
Internal modem	\$450
Battery charger	\$25
128K-byte random-access memory card	\$195

could. I anticipate some problems for IBM," said Greg Allman, senior consultant, personal computer department, for the New York-based accounting firm Deloitte Haskins & Sells.

But others are interested in purchasing the PC Convertible. "The lap-size machine might have some popularity; we have some people who travel quite a bit that are interested in lap-size machines," said John Kane, project manager, automotive operations, for Rockwell International, based in Pittsburgh.

Others remarked that the PC Convertible does not offer the technological breakthrough needed to stimulate the weak lap-size market. The machine uses a CMOS version of the Intel Corp. 8088 microprocessor or CMOS versions of the Intel 80286 mi-

croprocessor are not currently available — and LCD screen technology that has drawn criticism for lack of readability.

The black-on-white 80-cpi by 25-line LCD screen uses a special bonding process to reduce glare and offers an adjustable screen angle. Unlike the Zenith Data Systems Corp. system that won two prominent federal government bids, the LCD is not backlit. IBM decided that power consumption would be too high, according to officials.

IBM will offer optional displays for desktop use as well as a 300/1,200 bpi/sec. internal modem and a portable dot matrix printer.

IBM also announced optional 3½-in. internal and external disk drives for its desktop machines. "I anticipate that 3½-in. [disks] will be a very

well received media," said William Lowe, president of IBM's Entry Systems Division.

Almost simultaneously last week, the top four micro software vendors, joined by a host of smaller vendors, announced the availability of software for the new format. Each, however, seemed to present different and not quite formalized approaches to selling 3½-in. versions.

IBM's own solution is to sell both 5¼-in. and 3½-in. versions of its software in the same box. Lotus Development Corp. will allow registered owners to purchase a 3½-in. version of its packages at a reduced price, although a version of its Symphony package will not be released until the fall.

Microsoft Corp. will make 3½-in. versions of its software available through retailers, and owners of the latest versions of Microsoft software can convert to the new medium at no charge. Ashton-Tate will sell each version as a separate product. Micropro International Corp. will replace its customers' 5¼-in. diskettes with the new medium for \$20.

But most corporate users see 3½-in. drives as simply causing headaches. "Every time a standard changes like that, it complicates our life. So now I have to get ready for another complication," said Bill of Blue Cross/Blue Shield.

Also announced were several IBM programs on the 3½-in. format, including the \$189 IBM Macro Assembler, the \$539 Basic Compiler, the \$495 C Compiler and the \$450 IBM Displaywrite 3.

In other news, Lowe said that IBM would no longer market its slow-selling Portable Personal Computer.

Senior Editor Eric Bender contributed to this report.

TOP OF THE NEWS

NEWS from page 1

agreement will call for the continuation of Apricot computer production in the UK with distribution to be handled by the new owners of Apricot in the U.S.

Application-specific Integrated circuit manufacturer LSI Logic, Inc. today will announce proprietary software that reportedly speeds up the design and development time on its application-specific circuits. LSI will use the software in a design service for sale to its customers.

The company will also introduce several products in its megacell compiler family.

Information Builders, Inc. of New York will announce a version of Focus to run under the Unix operating system at its users group meeting to be held this week in New Orleans.

Also scheduled to be announced is Mainframe Focus, Release 5.6, and Version 2 of PC Focus. It will also inform customers that a new division of the firm has been formed to develop Focus applications, according to Information Builders officials.

IBM's Lowe pushes desktop use of laptop

By Eric Bender

NEW YORK — While in development, IBM's new PC Convertible traveled under the unglamorous name of "P12." Entry Systems Division President William Lowe said last week. Despite all the press reports, "We never called it Clamshell," he told Computerworld.

Large corporations already have ordered "significant numbers" of the PC Convertible, and IBM does not see it as a niche product, the head of IBM's Personal Computer group said.

Lowe, who has been using the Convertible at home, outlined three reasons he expects the Convertible to outsell previous lightweight micros. "It has better readability of the screen and full PC compatibility," he said. "And it's a desktop product which travels, as opposed to being just a laptop."

In an exclusive interview and in press sessions, Lowe also outlined his views on moves toward 3½-in. disks and on other aspects of the latest IBM product avalanche.

While 3½-in. drives offer advantages over 5¼-in. models, "The 5¼-in. models will be with us for a long time," Lowe said. Such transitions are never abrupt, and vendors that push for them too quickly stand to

lose a lot of money, he added.

Two new offerings — program swapping under Topview and bank switching for 3270 Personal Computers — represent the only expanded-memory options that IBM will support until the arrival of a version of PC-DOS that leaps the 640K-byte barrier, Lowe said. He reaffirmed that

"It's not our strategy to change things for the sake of changing things."

— William Lowe
IBM Entry Systems Division

IBM places "very high priority" on crossing the 640K-byte barrier.

Technical reasons prevent IBM from offering the new Enhanced Personal Keyboard — which is "almost identical" to that of the RT Personal Computer — for existing micros, Lowe said. "That would be a very expensive option to pursue, maybe impossible. It would require changes to the BIOS," he explained.

In large accounts, "the 3270-PC is

going to play a more important role," according to Lowe. He said that customers have questioned IBM's intentions for the line, which was created outside of the Entry Systems Division and always seemed to be the last IBM micro to run new applications. However, last year's move of the 3270-PC development group to the Entry Systems Division and last week's enhancements both underline IBM's commitment to the family, Lowe said.

Overall, IBM sees a changing environment for microcomputer sales, including slower industry growth and heightened requirements for quality and reliability, Lowe said.

With technological advances coming at least as quickly as in the first half of the 1980s, IBM will make more frequent micro product announcements, Lowe said. He emphasized plans to integrate functions at the silicon level, resulting in improved price/performance.

Lowe reiterated IBM's commitment to open architecture and said, "It's not our strategy to change things for the sake of changing things." But as hardware development speeds up, he said, "for compatibles to remain compatible, they're going to have to be very effective."

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NEWS

IBM laptop stops the show at otherwise ho-hum Comdex

Smaller drive size sparks speculation

By Peggy Meert

LOS ANGELES — The unexpected appearance of IBM's new PC Convertible laptop personal computer and 3¼-in. disk drives for current machines woke up the small crowd at Comdex/Winter.

On opening day, the 2,400-foot IBM booth featured the usual fare of familiar Personal Computer products. But early in the morning of the second day of an already dragging show, while their counterparts in New York were introducing the Convertible, IBM staff in Los Angeles were restocking the

show display with models of the new machines, which some of their colleagues were not even aware of the day before.

"We knew there'd be an announcement April 2, but that's all we were told until after 9 a.m. Eastern time," said Paul Luthor, one of IBM's first shift of representatives at the Comdex booth who was straining for his own look at the Convertible over the shoulders of showgoers.

Timing was deliberate

IBM's timing was deliberate, designed for exposure at both Comdex and the West Coast Computer Faire in San Francisco a few days later, according to Fred McNeese, IBM communications/infor-

mation officer.

"We were prepared to make the switch" from the original display, he said. "We came in before the show opened [the second day], put up the signs and products. We're quite pleased."

The West Coast appearance of the Convertible animated show attendees and members of the press who had not already sneaked out early.

I'm lucky I'm here

"Here I was, thinking I'm stuck at the most boring Comdex in the world and then this made me feel like, gee, I'm lucky I'm here," said analyst Jan Lewis, president of Palo Alto Research Group in Palo Alto, Calif.

She called the long-awaited IBM laptop "an exceptionally well-designed machine" and pointed to the 3¼-in. drives as IBM's clear message to switch to the smaller medium.

"I think this [the laptop] is a precursor to a JX-type, low-end machine," she said, referring to the 3¼-in. drive desktop machine IBM markets in Japan.

"The only thing that's going to make you convert [to 3¼-in. format] is for IBM to come out and say, 'There it is: Start your engines, start your conversions.' The only one who could do this is IBM."

At first glance, however, users resisted conversion.

'Big risk with those little disks'

"They might be taking a big risk with those little disks," said Ralph E. Fasciell, president of Los Angeles Marketing Group in Long Beach, Calif., after taking a look around the IBM booth. "If they really want to push the small disks, they should put them in a new desktop machine."

Right now, the smaller format is available only as an add-on internal disk drive or external disk that also serves as converter for a system with the larger, 5¼-in. floppies.

"I don't want to buy new software," said Rick Wallace, president of Telemedia Concepts, Inc. a Santa Monica, Calif., video training developer. Wallace said he specifically bought a Zenith Data Systems Corp. laptop because it read and ran the same formats as the IBM PCs and Personal Computer XT's in his office.

Predicts switch to 3¼-in. disks

But analyst Tim Bajarin, vice-president of the microcomputer research division of Creative Strategies Research International, Inc. in San Jose, Calif., who also consulted with IBM in the Convertible's development,

said he stands by his 1983 prediction that by 1988 the market would largely switch to 3¼-in. floppies.

"You'll see a system with 3¼-in. drives [from IBM] by the end of 1986," he said. He also predicted that the Convertible "will be a hit."

"The product will initially go well in vertical channels," Bajarin said, but even IBM's own software conversion may take a while. However, the analyst said he expects development for this laptop's new format to crowd development for other systems.

another format — even IBM's — but to cooperate eventually.

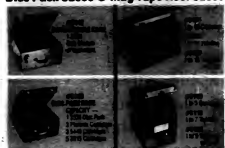
"The software won't come out on this as fast as everybody thinks," he added.

Microsoft Corp. and Lotus Development Corp. are both fairly far along in development on the 3¼-in. format, Bajarin said, but even IBM's own software conversion may take a while.

However, the analyst said he expects development for this laptop's new format to crowd development for other systems.

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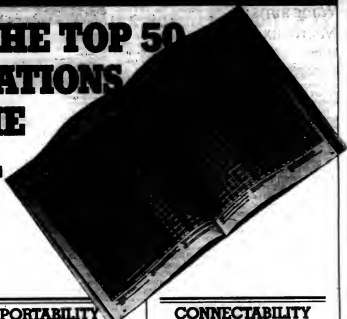


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Albany	April 17	Des Moines	March 19	Montreal	April 18, May 14	Saginaw	April 24
Albuquerque	March 6	Detroit	March 19, April 8, May 7	New Orleans	May 21	Salt Lake City	April 3
Anaheim	March 4	Fl. Lauderdale	April 10	New York City	March 11, 19,	San Antonio	April 22
Atlanta	April 22	Fl. Worth	March 11		April 9, 22, May 14	San Diego	April 17
Austin	March 25, May 27	Halifax	March 19	Newport Beach	March 18, May 13	San Francisco	March 25, April 24
Boise	March 20	Houston	March 20, April 17, May 15		April 15	Seattle	April 3
Boston	March 11, April 15, May 13	Huntsville	May 8	Oklahoma City	April 15	Sunnyvale	March 11, April 10, May 8
Chicago	March 13, April 16	Indianapolis	March 11	Omaha	April 22	Syracuse	May 8
Cincinnati	March 4	Irving, NJ	March 20, May 15	Orlando	April 9	Toronto	March 4, April 8, May 6
Cleveland	April 2	Kansas City	May 6	Ottawa	March 13, April 10, May 8	Tulsa	May 20
Columbia, SC	March 11	Lansing	March 11	Philadelphia	March 20	Vancouver, BC	April 22
Columbus	March 5	Little Rock	May 13	Phoenix	March 27	Washington	March 5, 19,
Convent Station, NJ	April 7	Los Angeles	March 13, April 8, May 8	Portland	March 4, May 6		April 9, 22, May 7
Dallas	April 1, May 6	Lubbock	April 8	Quebec	June 18	Wichita	April 15
Dayton	April 3	Milwaukee	May 21	Rochester	March 18	Winnsboro	April 17
Denver	March 13, April 8, May 15	Minneapolis	March 27	Sacramento	May 13	Winston-Salem	March 27
				St. Louis	April 9, May 14		

NEWS

Wang aims at Microvax II

From page 1

the distributed data processing environment, said Harold Aono, Wang vice-president of product planning and management.

Early customer reaction appears positive. "We have ordered 22 VS 5s to replace the same number of VS 25s in our field offices," said Neil O'Brien, director of systems and programming at MONY Financial Services in Syracuse, N.Y. MONY has a total of 92 VS machines of various sizes. The VS 25 had internal disk space only, he said, and the VS 5, which has the benefits of being smaller and cheaper than the VS 25, also allows external disk systems.

Better price/performance

Don Breitenbach, vice-president of MIS at American Family Mutual Insurance Co. in Madison, Wis., will bring in about 25 VS 5s per month for the rest of 1986. The company already has about 150 each of Wang's VS 16s and VS 25s in field offices as part of a distributed system for agents. "We expect the VS 5 to be the same order of magnitude better than the VS 15 as the VS 15 was to the VS 25," he said. When the VS 15 came out, it was technologically superior, smaller, and it had better price/performance than the VS 25, he added.

In a demonstration, Wang ran a VS 6 with 2M bytes of memory attached to eight intelligent terminals against the largest Microvax II model with 9M bytes of memory and eight DEC VT220 termi-

nals attached. The VS 6 completed a group of tasks in less than one minute; the Microvax II took about five and a half minutes. The tests, developed by Wang, included both Cobol data processing and office automation portions. "In a Portran environment, of course, the Microvax would do better," a Wang spokesman said.

When asked to comment on Wang's claims, a DEC spokesman said that without knowing the content of the tests, DEC could not make a formal reply. "But give me a little time and let me write the software, and I could make any machine run faster than another. I would make darned sure I looked better than they," the spokesman said.

"Wang is going with the industry trend to make smaller and smaller packages with more attractive prices," noted Judy Davis, an office automation specialist at Patty Seybold's Office Computing Group in Boston. As far as comparisons with DEC's Microvax, "I don't really know whether they are comparing apples to apples," she added.

According to Vincent Flanders, associate editor of Access '86, an independent magazine dealing with Wang systems, Wang is trying to point out that the Microvax II is a scientific machine that DEC is trying to sell as an office automation product. Wang's systems are clearly better than the Microvax in OA applications, he maintained. "I would have thought they would price the software for the new systems a little lower, but they are still very competitive with DEC and Data General Corp. equipment, and definitely

Wang VS line				
	VS 5	VS 6	VS 15	VS 25
Maximum Diskless	10	24	32	64
Memory	1	2	4	8
I/O bandwidth (Megabytes)	2.5	5	5	5
Price (Monthly)	\$12,300 (1M byte)	\$18,950 (1M byte)	\$11,950 (1M byte)	\$25,200 (1M byte)

Minimum of 1 megabyte per external disk drive

they blow IBM's System/36 and System/36 Personal Computer out of the water."

Wang has three tiers of software prices, classes A, B and C, that allow users of smaller machines like the VS 5 and VS 15 (class A) to pay less for software than users of the next two tiers.

Both of the new systems offer an optional remote diagnostics package that allows Wang customer engineers to access systems by telephone to diagnose hardware and software problems. In several configurations, the VS 5 and VS 6 systems can be installed by the user.

The 32-bit machines are reported to have an average microinstruction execution time of 480 nsec for the VS 6 and 200 nsec for the VS 5. They include a bus processor with its own 16-bit microprocessor that controls system I/O, which is said to free the CPU for higher priority tasks.

VS 5 to replace VS 15 low end

The VS 5 will supplant the VS 15 in some cases, Aono said. It has fewer expansion slots — three instead of the VS 15's five — but it will replace the low end of the VS 15 configurations, or about 80% of its market.

The VS 5 supports up to eight users and a total of 16 peripheral devices. It includes 1M byte of memory, a diskette drive, facilities for attaching up to 2.6G bytes of external disk storage and four data communications lines. Options include another megabyte of memory, a second 67M-byte internal disk drive, a 5-in. 14M-byte cartridge tape drive, a 9-track 25M-byte tape drive and all current VS external storage devices.

MONY's O'Brien is curious to see what the asynchronous printer port on the machines will do for users. "Before, you had to use Wang printers or terminals, but now it's possible to put somebody else's driver on to run the printer through that port. The third-party people will jump on that board."

Flanders said that Wang is working on external disk drives and high capacity

tape drives for the interface that will be announced this summer. The asynchronous port and the small computer systems interface in the new systems will lead to much third-party activity, he added.

One facet of the new machine that O'Brien is not too happy with is the fact that it must be booted off the internal disk. "If the internal disk is down, you can't initial program load the system. It's not a critical weakness, but I would have designed it differently."

The VS 6 will have a 20% impact on smallest configura-

tions of the VS 65 line, which supports up to 40 users. Aono said. The VS 6 is basically a VS 65 in a smaller box, supporting up to 16 users and a total of 24 peripherals. It includes 1M byte of memory, a 5-in. 67M-byte Winchester disk drive, a 5-in. 14M-byte diskette drive and facilities for attaching up to 2.6G bytes of external disk storage. It also includes 16K bytes of cache memory, facilities for eight data communications lines, and the option to increase memory to 4M bytes.

Upgrades from the VS 5 to the VS 6 require replacement of the CPU and memory and cost \$11,000. Upgrading from the VS 6 to the VS 65, which costs \$16,000, requires retaining the CPU and memory and replacing the cabinet.

The company also released its two-piece 4250A workstation for the VS, OS/8 and Alliance series machines. It costs \$2,200 — about 20% less than the existing 4230 — and has a monthly maintenance charge of \$10.

Buyers should know that Wang has notified its sales force that the 4250A is in short supply, and Wang reserves the right to substitute a version of the former 4230, Flanders said.

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NEWS

Floating Point's hypercube architecture aimed beyond Cray

**Goal of 60 GFLOPS
by 1987, 16-node
unit due this month**

By James Connolly

BEAVERTON, Ore. — Drawing analogies to Cray Research, Inc.'s introduction of its first wordless supercomputer in a seemingly limited market in 1977, Floating Point Systems, Inc. last week announced a massively parallel supercomputer that it claims allows links of more than 16,000 processors.

If Floating Point can deliver a maximum configuration of 16,384 processors in a hypercube architecture, the manufacturer of scientific computers and array processors could vault past Cray's high-end Cray-2 by performing 265 billion floating-point operations per second (GFLOPS) compared with the Cray-2's 2 GFLOPS.

Floating Point officials said the company has received three orders for 16-node, 256 million floating-point operations per second (MFLOPS) versions of the new T Series systems, which are scheduled to be delivered in late April. However, a spokesman noted that installation of those \$900,000 systems will be on a trial basis. Officials at Floating Point said that systems with 4,096 nodes should be available in mid-to-late 1987 at \$60 million for a 60-GFLOPS system.

Software availability in question

The company acknowledged a lack of readily available software but said Cray faced similar problems when it announced its Cray-1 and that, unlike Cray, Floating Point is offering a compiler. Officials claimed that the T Series' performance will attract developers.

"Medium-size configurations of the Floating Point T Series are capable of speeds greater than any other existing supercomputer. The T Series will allow customers to address problems previously considered unsolvable," said Floating Point Chief Executive Officer Lloyd D. Turner.

Analyst Jeffrey Canin of Hambrecht & Quist in San Francisco said that software availability is the real question for Floating Point and that it may take several years for applications to be developed. He added that the low-end systems will be attractive to people who want to experiment with parallelism. Canin said he does not view Floating Point as a threat to Cray because the high-end T Series machines will address problems that even Cray-2 users will be unable to solve.

Turner said the market for such high-end supercomputers will grow as researchers realize that they can solve larger and larger problems with massive parallelism. Target markets include government agencies such as the U.S. National Science Agency, the oil industry for seismic analysis, chemical analysis, weather forecasting and the aerospace industry for fluid dynamics applications.

The T Series consists of multiple 64-bit Innos International, PLC Transputers, with each Transputer featuring 8 million instructions per second scalar performance and 16

MFLOPS of pipelined vector arithmetic performance.

A basic system consists of a single cabinet with up to 16 nodes, 1M byte of memory per node, a power supply and two 136M-byte disk drives per node. The processor nodes are linked via a 32M bit/sec. bidirectional network. Cabinets must be placed within 40 feet of the next nearest cabinet.

Floating Point will not be the first company to deliver massively parallel systems. For example, Intel Corp. claims to have installed approximately 30 of its Hypercube systems, for which the maximum configuration is reportedly 128 processors.

Boston-based Yankee Group analyst Thomas Henkel noted that Floating

Point had to do something because it has been pressured by start-up companies from below and by Cray from above in the scientific computer market. He said that T Series customers will have to embark on major software development efforts to use the hypercube architecture.

'You do not want to be playing games'

One university researcher questioned whether practical applications exist yet for a 262-GFLOPS system such as Floating Point proposes. "I'm sure we could find a problem that big. But the question is, What kind of problem can it solve easily that would make it worthwhile? You

do not want to be playing games with something like this," said Charles F. Bender, director of the Advanced Computational Methods Center at the University of Georgia.

Bender added that most of his center's work has focused on developing applications and training people to work with smaller scale parallel systems in the four- to 16-processor range.

However, Bender also said it was interesting that the T Series is offered with Innos' Ocean language rather than Fortran. He noted that too many people try to move Fortran applications onto parallel processors that were not intended to run Fortran.

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NEWS

Broker's asset management

From page 1

tions and DP budgets," says Jeffrey Heid, a group manager at Fairfax, Va., consulting firm Network Strategies, Inc., which has been doing consulting work for Merrill Lynch over the past two years. "T. Rowe Price is that kind of company but an exception to the rule."

T. Rowe Price currently operates one Wang Laboratories, Inc. VS 100 and one VS 300 minicomputer for marketing and institutional investment management. Its information systems staff, headed by Goodman at the corporate level, consists of eight telecommunications staff members, 17 data center staff members and three information center people who support investment professionals and others who primarily perform Lotus Development Corp. 1-2-3 modeling on 150 IBM Personal Computers.

But while T. Rowe Price's strategy saved Goodman's people much DP housework, it also added them with a

the shareholder wants to know if the income was transferred to his account," Goodman says. The account representative must be able to call up the information quickly on his terminal, no matter whose system it happens to reside on.

The majority of account representative inquiries are made to an Amdahl Corp. 5870 mainframe at DST Systems, Inc., a Kansas City, Mo., service bureau that maintains records for some

800,000 individual shareholder accounts.

The other 200,000 account records reside on an in-house Wang VS 300. Baltimore service bureau DP Associates, Inc.'s mainframe, which handles overall record keeping and investment support applications, is most frequently accessed by account administrators. The administrators oversee the operational aspects of managing an investment portfolio, such as implementing the investment

decisions of money managers.

But administrators will sometimes need to access the DST system for information on mutual funds held in individually managed portfolios. Also, representatives need to access records residing on the mainframes of financial institutions on the East Coast.

State Street Bank in Boston, for example, has a record keeping system for custody of T. Rowe Price's 17

mutual funds totaling \$12 billion in assets. The system keeps the official accounting records of the mutual funds — for example, what securities are held within each portfolio. A Bank of Boston mainframe maintains the records for Price's 20,000 real estate limited partnership accounts, totaling \$90 million in assets.

"They keep track of who owns what piece of the partnership and of accumulated interest," Goodman says.

IF WE SAID, "THERE'S A 4GL DBMS THAT CAN BUILD APPLICATIONS TEN TIMES FASTER THAN ANYTHING ELSE OUT THERE,"

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"We have no
"invested here"
bias."

— George S. Goodman
T. Rowe Price Associates, Inc.

tangle of telecommunications troubles. To keep account representatives in touch with the current status of shareholders' assets, the information systems staff has had to deal with a spiderweb of leased lines and a morass of incompatible communications environments.

Part of the problem stems from the sheer bulk of T. Rowe Price's operations. The investment house currently operates approximately one million shareholder accounts — invested in 17 money markets, bond and equity mutual funds — as well as real estate limited partnerships and portfolios for employee benefit programs, endowments, foundations and individual investors.

Shareholder records have been turned out by type of account to the in-house computer systems of various financial institutions and service bureaus. The problem was providing approximately 120 account representatives and 150 account administrators with easy access to those remote systems. According to Goodman, account representatives spend a good part of their day handling 24-minute conversations with shareholders.

"For instance, an income dividend gets declared, and

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NEWS

Pershing & Co., a brokerage clearing subsidiary of Wall Street company Donaldson, Lufkin and Jenrette, Inc., keeps track of more than 16,000 T. Rowe Price discount broker accounts.

Mark Rayford is vice-president of T. Rowe Price Services, Inc., T. Rowe Price's Mutual Funds division. He says that account representatives often need to access more than one system during one short phone call because, he says, "there is a lot of

crossover between different types of account. For example, about 70% of real estate limited partners reinvest their income in mutual funds. So representatives often need shareholder records from DST's computer and limited partnership records from Bank of Boston."

Access from a single terminal

T. Rowe Price wanted to give representatives and administrators access to all its service providers' systems

from a single terminal. That meant more than just running leased lines out to Boston, New York and Baltimore; it required interfacing with an information system manager's nightmare of IBM-compatible and IBM-compatible mainframe communications protocols.

In spring 1985, T. Rowe Price addressed its data access problems with the help of Argos Computer Systems, a New York-based consultant company and systems inte-

grator. Argos' Front End Concentrator/1 (FEC) was installed as T. Rowe Price's telecommunications network hub.

Based on an IBM Series/1, FEC is a combination protocol converter, network manager and data concentrator. It cut T. Rowe Price's leased-line costs by decreasing the number of lines needed to carry the company's data traffic.

The FEC/1 also monitors network traffic and complex

system usage statistics.

According to Goodman, however, the great advantage the new system provides is flexible connections between service providers' remote IBM hosts and "accountants who need to talk to more than one host."

The FEC/1 enables one terminal to access a wide range of IBM communications environments. It can appear to a host as a local IBM 3872 controller, a single 3274 polling unit under Synchronous Data Link Control or a remote 3270-type controller using bi-synchronous protocols. "Which type of host is being accessed is transparent to the user," Goodman says.

A one-service straitjacket

He added that prior to installing the Argos system, T. Rowe Price made do with a "serial arrangement with DST — one terminal, one controller, one leased line, one mainframe." The arrangement trapped the investment house in a one-service straitjacket.

"We either had to get what we needed from DST or install multiple terminals at each desk. We wanted the flexibility to go to whomever offers the best product and price. What we have now is better from both business and operations standpoints," Goodman says.

T. Rowe Price will shortly be installing an IBM mainframe so that it can bring applications in-house whenever it seems cost-effective. "We have no 'investment here' biases," Goodman says.

"Once we have the mainframe, we have the choice of buying someone's service and running another wire into the FEC, or buying off-the-shelf software if it's available, or developing the application ourselves — whichever is best in terms of timeliness, cost and quality."

T. Rowe Price mutual funds have realized a 25:1 cost savings with the voice system, according to Goodman. "And our customers have access to more consistent, current data 24 hours a day, seven days a week. They're never put on hold."

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VIEWPOINT

EDITORIAL

Caveat emptor, but...

The ingredients are familiar: a high-flying entrepreneur, a hot market, a new product, a bold — and expensive — advertising campaign. For Xanaro Technologies, Inc., however, the result was not the expected success story.

In an ingenious display of smoke and mirrors, Xanaro founder and President Robert Hrynkiw created an impression of solid financial backing, then spent his way to \$8.4 million in debt in two years.

His was a vain attempt to stir up demand for an integrated product positioned against those of software heavyweights Ashton-Tate and Lotus Development Corp. What Hrynkiw stirred up instead was the wrath of angry creditors.

In this week's final chapter, the bankrupt Canadian software house responded to a court order to liquidate by selling the source code for its highly touted Ability software. The buyer was Migent Software, Inc.

The lesson in all this for computer professionals? Some will cite Xanaro's saga to argue for corporate bans on purchasing from small, unproven suppliers. We see this as an obvious (not to say, odious) extension of the buy-from-IBM-and-you'll-never-be-fired philosophy.

It would be most unfortunate if experiences like that of Xanaro led to further entrenchment of conservative purchasing habits within DP/MIS departments. While DP/MIS managers have a responsibility to evaluate rigorously a new vendor's management and financial soundness — as rigorously as they evaluate the technical soundness of the vendor's product — they would be foolish to ignore the innovative products and services that come from small suppliers. Lotus, for example, was once a small upstart, pitting its unknown 1-2-3 against flush VisiCorp and its popular Visicalc.

The Xanaro experience notwithstanding, similarly dramatic micro software success stories are still very possible. We can think of such recent examples as Autodesk, Inc. and Borland International. There will be others, as markets open and needs arise.

The DP/MIS manager has a responsibility to investigate new companies and new products, along with his responsibility to reassure management by patronizing IBM. Managers who ignore the entrepreneurs and pioneers may be avoiding short-term risk, only to take the often greater long-term risk of saddling their institutions with less than state-of-the-art systems.

Notes & observations

Need more evidence that telecommunications is a hot commercial technology? None other than that savvy, world-class investor Ferdinand E. Marcos, late of Manila, had acquired a largish chunk of two major communications companies. According to Philippine sources, Marcos commanded a controlling 26% interest in Philippine Long Distance Telephone Co. and a 40% slice of Philippine Communications Satellite Corp., which is franchised by the International Telecommunications Satellite Organization to link Philippine ground stations with Intelsat's global satellite system.



LETTERS TO THE EDITOR

A call for DP scrutiny of Star Wars

I am very disappointed that there has not been more discussion of President Reagan's Star Wars proposal in the pages of *Computerworld* and other industry journals. This proposal will depend very heavily on computer technology and complex software.

No experience in data processing indicates that even fairly straightforward applications have numerous unforeseen effects and that a system as complex as Star Wars will not work in the way it has been promoted. There have been major and minor problems uncovered in every software system. Even the space shuttle software, with its many levels of testing, has had operational problems.

With the software development experience of the readers of this journal, how can we in good conscience say that the Star Wars system will work, especially when it cannot be fully tested without a full-scale nuclear war? More discussion is needed on this subject and the general public needs to become more aware of the extreme complexities of the Star Wars defense. The data processing community has a responsibility to contribute to this debate.

Ronald L. Sigrist
Kernersville, N.C.

Software lemons sour business

My partner and I recently filed a lawsuit against a software company, . . . and I just read an In Depth article in *Computerworld* "Lawsuits may choke U.S. software industries" (CW, March 3).

To start our new business, we had to put up our homes as collateral to purchase the company's software and hardware to perform one task, as defined by U.S. Postal Service regulations.

We're certain the software's defective, and even though the company's manager of technical support admitted it, do you think the firm came forward and helped resolve the problem . . . fixed it, replaced it, or took it back?

The author bemoans the fate of software manufacturers dragged into court. His reasoning: "God has not allowed man to produce perfect software. [Therefore] the U.S. is better off with imperfect software than none at all."

Perhaps the author is advocating yet another mandatory government stamp: "Warning: The software general has determined that use of this

software may be disastrous to your business."

Charles A. Coleman Jr.
Vice-president
Marathon Mail Management, Inc.

Who says analysts can't do it all?

The article "Systems analyst wanted: No programmers need apply" (CW, Feb. 17) addresses only one half of the old business vs. data processing experience question.

The author seems to assume that one could become a systems analyst without gaining a great deal of business experience. In reality, a competent systems analyst requires a great deal of practical experience in both areas. To place more emphasis on one area over the other is like separating an automobile engine from the body. A business is supposed to be a number of individual parts combined to form an efficiently running unit.

The article states that most analysis is performed by MIS but fails to mention that the analysis is most often requested by corporate management. The most common reason the project is left to MIS is that most user departments are uncomfortable with change and are unwilling to perform the analysis themselves. Ask any systems analyst how many times the question "Why?" is answered with, "We've always done it this way."

Good computer systems cannot be designed after taking a couple of courses in computer science at the local university. The classroom does not always reflect the real world, and those neat examples in the textbook never seem to occur outside its pages. Computer expertise, like business expertise, is gained by experience and observation.

The article states that a systems analyst who is less than expert in business issues will cripple a company. I say an analyst who is less than an expert in computer issues can cripple a company just as badly. The only difference is that in the latter situation it will take longer to find out.

The article helps perpetuate the ingrained prejudice that people have for computers and computer types. In truth, the goal of every systems analyst should be to learn as much about business systems and computer systems as possible. To do less would truly cripple a company.

Jack McCart
Senior systems analyst
Duckwall-Alco Stores, Inc.
Abilene, Kan.

VIEWPOINT

On writing keynotes: Try artificial intelligence

By AMY D. WOHL

Sitting in the audience at the keynote session of the Office Automation Conference in Houston, it became all too clear. I had broken the first rule for experienced conference attendees: I had gone to the keynote address. And I was sitting too near the front to beat a speedy and unobserved exit. There was nothing to do but sit and listen.

Suddenly, it came to me. What the computer industry needs is an artificially intelligent software package to generate keynote speeches. It wouldn't have to be too smart — just smart enough to replicate the efforts of the average keynote speaker. And the algorithms wouldn't need to be very complex. After all, what most keynoters seem to do is take their latest sales pitch and turn it into a slightly generic version, suitable for public consumption.

The rules for writing this expert system would be simple:

- Take a sales pitch from the speaker's portfolio — alternatively, take out his favorite hobby horse.

- Incorporate a few good selections from your Buzzword Speech Generator Data Base. Good 1986 buzzwords include standards (that was the favorite in Houston), open system, interconnection and that all-time favorite, integration.

Buzzwords, like most fashions, come and go, so the expert would need an updating function for the

Buzzword Speech Generator Data Base; this could be supplied by having the expert digest recent keynote speeches or read back issues of the editorial pages of *Computerworld*.

- Create an Industry Trends Data Base. This is required to execute the instruction to spit on every product and concept your company doesn't

sell — in the most polite and most pompous way possible. Note: It doesn't matter whether these products are any good or not — obviously, if the audience had wanted to hear them praised, they would have invited a keynoter from that company.

- Assume the audience that the speaker's company is the best and the brightest and that it got that way through the speaker's leadership. This is harder to pull off if the speaker joined the company only recently; in that case the speaker must allude to serious problems in the firm's early history that have been overcome through his brilliant insights.

- Mention as many as possible of the past and current products made by the speaker's company. Speakers who manage to mention every product their firm has ever produced get a special Gold Star Award.

- Discourage other vendors from entering the industry by talking about (choosing) how hard it is to enter the industry; how much competi-

tion there is from the Pacific Rim vendors; how IBM is about to obliterate everyone but the speaker's firm; or how margins have all but vanished.

- Be certain to make at least three references to the computer revolution — and five to IBM. A special award is granted speakers who manage to refer to IBM five or more times in their speeches without actually saying "IBM" or the rarely used "International Business Machines Corporation."

A Blue Data Base will need to be created to contain these important euphemisms, including "Big Blue," "The Itty Bitty Machine Company" and "They're not the competition, they're the environment." Fortunately, this data base rarely needs updating.

This is not directed at any particular keynote speech — most of the ones I've heard would be good contenders for at least a few barbed comments. Rather, it is intended to ask the question, "Why does this happen?" Think about what a keynote speech is for: It collects a large audience of people with some common interests, often a thousand or more. It is intended to inspire the attendees to insight or action. Especially, it is expected to make the event the keynote proceeds more meaningful by helping the attendees understand the experi-

ences that will be available or by setting the next few days' activities into a broader perspective, drawing on the keynote speaker's knowledge and experience and hopefully upon his skills as a speaker.

And what do we all too often get? A large group of bored attendees who spend the rest of the conference complaining about the keynote speech, which, if it inspires anything, it is likely to be the insight that going to keynote addresses is a waste of time. It is likely to have very little to do with the conference at all. In fact, the purpose of the conference and its goals are rarely mentioned beyond the introductory remarks in the first paragraph and the closing remarks in the last.

If the real purpose of a keynote is not to give the conference attendees a last chance to rest their feet — or a chance to meet their colleagues and compare dinner plans — those things should not happen.

Maybe what we need to do is to stop selecting keynote speakers based on titles or past accomplishments. At computer industry conferences, this often reduces to a simple rule: Pick a chief executive officer of a recognizable company who's been successful at making money for himself and his organization.

Perhaps what we really need is an expert system for listening to keynote speeches. Then we could all sleep late, have breakfast with some young up-and-comer who's too new to be giving keynotes but has much more interesting things to say or spend some time thinking about why we came to this conference, what we hope to accomplish and how we're going to make that happen.

Wohl is president of Wohl Associates in Bala-Cynwyd, Pa., and editor of "The Wohl Report on End-User Computing" newsletter.

Charting the rocky course of technological change

By TOM VALOVIC

In the computer and telecommunications industry, the proliferation of technical options and the coupling of product life cycles makes the determination of future trends and product directions a difficult task. There are, however, a number of common principles that can be observed to be significant shaping forces in the march toward the integration of computer and communications technologies:

Convergence. Convergence generally implies that computer technology and telecommunications technology are both migrating toward the same goals and methods to accomplish those goals. Thus, IBM is becoming more like AT&T and vice versa, as both companies strive to become involved in each other's charter. From the end user's point of view, moreover, data communications is as much as part of a data pro-

cessing system as the computer itself. The push for standards, already gathering significant momentum, will accelerate convergence even further as manufacturers work to adopt common interfaces, protocols and operating systems.

Integration. Integration of function is extremely difficult to predict,

as witnessed by the current confusion over integrated voice/data terminals. Generally, as black box stand-alone products diminish in size with advances in very large- and ultralarge-scale integration technology, manufacturers continue to add value and enhanced functionality to retain a competitive edge and combat the phenomenon of shrinking margins. Some products, when this occurs, begin to resemble other products in both form and function. Thus, switching multiplexers resemble packet switches, and private branch exchanges have come to resemble local-area networks. This phenomenon accounts for much of the confusion being generated in the telecommunications market today, since as products continue to be given additional functions, the names original as-

signed to them are no longer accurate.

Etteralization. This refers to the tendency for hardware to migrate to software during the course of technological maturity. The ultimate end point will be the eventual dominance of software as different types of black boxes become more and more alike in function.

To cite an example, many banks are now using generic automatic teller machines, whereby through the use of a set of function keys similar to those found on a personal computer, the instructions for using the ATM are software based. This gives the bank the flexibility to change those functions at any time by simply reprogramming the software rather than buying new hardware. This trend will become more and more evident, fueled by both convergence and integration. In telecommunications, Integrated Services Digital Network and other software-defined networks are representative of this trend.

The bottom-line message to the computer professional is this: The future is in software. The cold hard reality behind this message is this: The

lack of programming professionals that currently exists will slow this progress down.

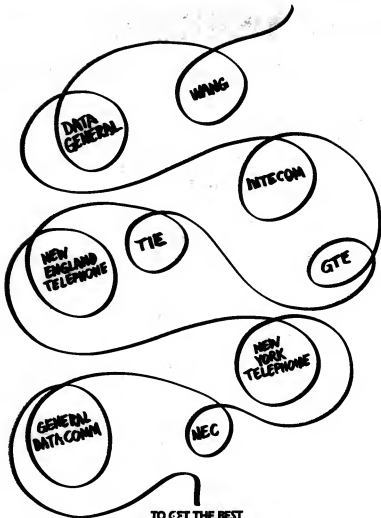
User romance. This term refers to the fact that, to be fully accepted as usable items, computer-based devices must be fully compatible with the way people like to use them. Artificially driven market demand can never substitute for this process of natural selection. Trial and error would seem to be the only way to negotiate this uncharted terrain.

New technology also requires time before we become comfortable with it. New applications, such as spreadsheet or data base management functions must be tried, used, judged, improved, revised and tried again before they are assimilated into a professional's work habits.

Thus, the real challenge that lies ahead is for the programmers and instructional designers to become more fully aware of the way people perform their professional tasks in the real world. The point is, as fast as we turn out new technologies and applications in the office automation arena, time is still needed to digest and assimilate their impact before any real evaluations can be made as to their long-term efficacy.

Valovic is a member of the marketing staff at a Florida-based telecommunications company. He is a frequent contributor to the computer and telecommunications trade press.

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COMMUNICATIONS



DATA STREAM
Elizabeth Horvitt

Competition vs. connection

A casual observer at the recent Interface '86 conference in Atlanta might jump to the conclusion that intervendor networking had at last arrived. At press conferences and in their booths, exhibitors sang the praises of universal connectivity and especially of the Integrated Services Digital Network, the ultimate telecommunications industry standard. And regional holding company Bell South orchestrated the interconnection of seven vendors' X.25 packet-switching equipment and service offerings.

Also, appearances can be deceiving. While significant connectivity offerings were announced, particularly in the IBM-to-non-IBM arena, most exhibitors seemed intent on expanding their own product lines, not linking up with someone else's.

The Bell South exhibit was admittedly an impressive display of seven-part harmony among Bell South, AT&T, MCI Corp., Amdahl Communications, Northern Telecom, Inc., Southern New England Telephone and Pacific Bell. But the only intervendor connection that should last longer than the exhibit is Pulsetek, Southern Bell's new packet-switching service that will form a bridge between regional customers and carriers such as AT&T and MCI that provide Inter-Local Access and Transport Area connections.

The exhibit was just a "technical demonstration" that made no promises of future interconnectivity products or agreements between carriers, according to Bell South spokesman Bill Marks.

Pulsetek is currently available from only two local telephone companies.

See COMPETITION page 23

Horvitt is Computerworld's senior editor, communications.

Vendors offer links to IBM mainframe environments

By Elizabeth Horvitt

ATLANTA — At least six exhibitors at the Interface '86 show held recently announced new products targeting the rapidly growing market for more versatile, cost-effective links into IBM communications environments. Two of the products are Ethernet connections; the other four offer links to Big Blue hosts over CCITT X.25 packet-switched networks.

Two networking vendors, Fibronics International, Inc. and Advanced Computer Communications (ACC), announced high-speed channel interfaces between IBM mainframe hosts and Ethernet local area networks. Bypassing the IBM cluster controller enables both products to achieve 10M bit/sec. end-to-end throughput.

ACC's ACS 9310 enables peer-to-peer communications among IBM hosts on an Ethernet network running Transport Communications Protocol/Internet Protocol (TCP/IP), according to Michael Seto, director of marketing for the company. The product provides host-to-host communications either through University of Califor-

nia at Los Angeles' Arpanet Control Program or Distributed Data Network/IMS software from Network Solutions, Inc.

ACS 9310 is a modular product with slots for future add-ons, such as an LU6.2/Systems Network Architecture (SNA) interface. Seto said. Priced at \$35,000, ACS 9310 will ship in limited quantities in June.

Fibronics' K200 supports peer-to-peer communications between IBM and non-IBM hosts using Knet Network Software from recently acquired Fibronics subsidiary Spartacus Computers, Inc. K200 supports both TCP/IP and Xerox Open Network Service (XNS) protocols on Ethernet. The hardware costs \$10,500, and the TCP/IP/VM host-to-host software costs \$5,000. The XNS version of the VM-based software costs \$8,500. An MVS version is due in July. Its pricing is unavailable.

Four companies released products that permit IBM users to communicate over packet-switching networks conforming to

See VENDORS page 23

Hybrid net management pending

Users to have access to any vendor's network statistics

By Elizabeth Horvitt

MOUNT LAUREL, N.J. — Multivendor network management is on the verge of becoming a reality if Avant-Garde Computer, Inc.'s Net/Command system is all the company claims it is to be — and if IBM goes ahead with a campaign for network management standards rumored to be in the works.

Net/Command is an IBM Personal Computer AT-based network control system that eventually will enable the user to access almost any vendor's telecommunications network monitoring and diagnostic system, according to David Hunter, Avant-Garde's director of communications.

"Net/Command alerts you that this port is not polling, that modem is down," Hunter says. The product assigns a driver function

key. A multiwindow color graphics display summarizes the status of different network subsystems and alerts the manager to trouble spots. Pricing starts at \$25,000, PC AT not included. It is currently in beta test.

Hunter admits that it will be some time before the product has full multivendor capability. The company is interfacing with one vendor's monitoring system at a time. "We're doing Codex Corp.'s Network Control System right now; most of what we already can access is IBM based," Hunter says.

According to Avant-Garde, Net/Command users soon will be able to access network diagnostics expertise through Net/Advisor. An expert system that runs on Symbolics, Inc.'s 3600 series of LISP com-

See MULTIVENDOR page 23

Sun unveils OSI software

TOP based, Sunlink can be used with MAP

By Rosemary Hamilton

MOUNTAIN VIEW, Calif. — Affirming its commitment to industry networking standards, Sun Microsystems, Inc. recently introduced networking software that conforms to the International Standards Organization's Open Systems Interconnect (OSI) specifications and last week announced that it had joined the Corporation for Open Systems (COS). COS is a nonprofit organization formed to advance the adoption of OSI, a seven-layer reference model. Sun said that

conformance to the standard will enable its workstations to communicate with multivendor systems in both factory and office environments.

Sunlink OSI, which the company said will be available in May, is based on the Technical and Office Protocol (TOP) specification and can be used to build networks based on Manufacturer Automation Protocol (MAP) specification. Both TOP and MAP use the same OSI protocols for higher layer functions such as session control and file transfer. However, the two networking standards implement different versions of the lower OSI layers that define how devices communicate over the networking

See SUN page 22

Comsat Technology, AT&T to launch VSAT satellite networks

By Stanley Gibson

ATLANTA — Adding momentum to the already accelerating VSAT market, Comsat Technology Products, Inc. (CTP) and AT&T recently announced VSAT satellite network offerings.

CTP, a wholly owned subsidiary of Communications Satellite Corp. (Comsat), will sell multimillion-dollar Starcom networks consisting of multiple VSATs and a hub earth station through systems integrators like American Satellite Co. Through its previously announced SkyNet service, AT&T hopes to lease and sell VSATs and install and manage satel-

lite hubs at customer sites, leaving businesses the option of owning and managing the systems in the future. Federal Communications Commission approval is still pending on SkyNet; Starcom is currently in beta test.

Both satellite network offerings transmit in the Ku-band, a frequency that is high enough not to interfere with microwave and other ground-level transmissions. This means that, unlike C-band dishes, VSATs do not require FCC approval prior to installation. VSATs also tend to be less expensive and support fewer channels

See CTP page 22

NEW THIS WEEK

■ Zenith Electronics introduces the Z-LAN broadband local-area network

■ For more on this and other new products, see pg. 73-93.

INSTANT ANALYSIS

"Contrary to popular belief, long-distance data traffic probably won't overtake voice traffic in our lifetime."

— Joaquín González, analyst, Gartner Group, Inc., Stamford, Conn.

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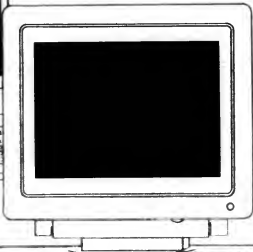
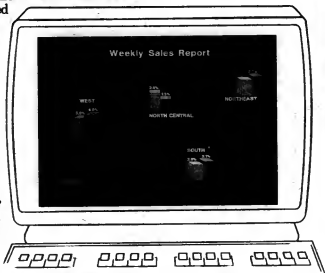
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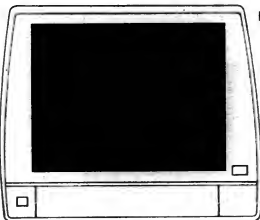
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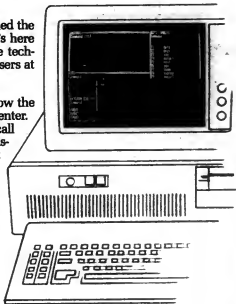
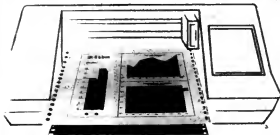
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COMMUNICATIONS

CTP, AT&T
to launch nets

From page 19

than other satellite terminals, so they often are installed by businesses with a number of remote sites that need to transmit to a central location.

Pricing the system from \$2 million to \$8 million, Comsat hopes to sell it to companies

with at least 100 different locations that need to communicate with a central site. Charles E. Reutter, CTP's marketing director, said that Starcom customers can expect savings of 20% to 40% over the cost of leased lines.

CTP's VSATs transmit data to the hub at 56K bit/sec. The hub transmits at 256K bit/sec. and performs protocol conversion and error correction so that the system is essentially "transparent to the user, even in polled

protocol environments." Reutter said. The system handles interactive data, electronic mail and high-speed facsimile transmission and voice.

A Starcom beta test system designed by American Satellite was recently installed at Halliburton Co., a Dallas-based oil industry service company. VSATs at 10 remote sites send data about such things as temperature and whether or not water is present to a central hub for

evaluation. The network will eventually connect nodes throughout the U. S. The company may extend the network worldwide by adding transponder space on two or three satellites, said Thomas Woods, Halliburton's director of information services.

Woods said the system is especially valuable to Halliburton because the VSATs provide connectivity to remote locations that cannot easily be reached by phone lines. Another benefit is that

after work at one site is completed the VSAT at that site can simply be moved to another location, Woods said.

While CTP supplies the hardware for others such as American Satellite to configure, AT&T will be taking care of system design and management for hardware manufactured by the Harris Corp. of Melbourne, Fla.

Customers pay between \$360 and \$400 per month per dish location for a customized network that includes design, management, maintenance, satellite transponder capacity and earth stations for a seven-year term. Typically, the hub station will be built and managed by AT&T at a customer's site, although a customer may take over management of the network for itself.

AT&T said it will offer financing to customers for the purchase of VSATs.

Skynet earth stations reportedly transmit at rates as high as 1.54M bit/sec., while the VSATs transmit at 56K bit/sec. Voice is not currently offered.

HUMAN RESOURCE SOLUTION

Sun unveils
OSI software

From page 19

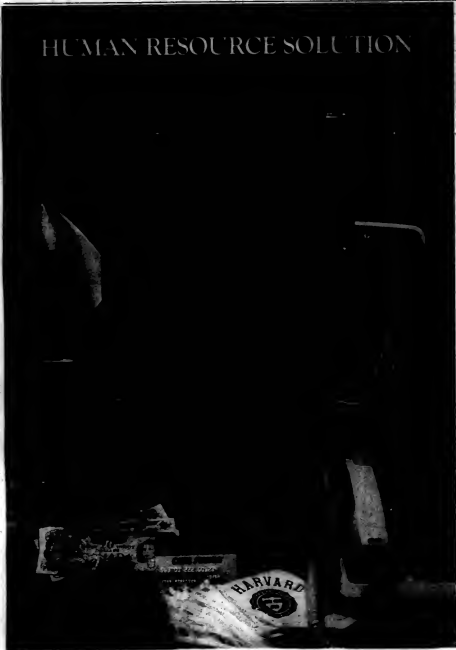
medium. MAP uses the token-bus protocols designed for the factory floor; TOP uses the Ethernet 802.3 protocols designed for office communications. TOP was designed to be MAP's counterpart in office environments.

Sun decided to base its product on TOP because "it was an easy first step. It's more like Ethernet, and we already have that," said Donna Horton, product manager of the Sunlink line. She said Sun will introduce a MAP-based networking software package later this year.

Sun said Sunlink OSI, which will sell for \$950, conforms to all seven layers of the TOP version of the OSI model. However Sun's specifications do not extend to the sixth layer, which has not yet been defined in the standard.

The product has been tested by various vendors, including IBM, Gould, Inc., Hewlett-Packard Co. and AT&T as well as by the Boeing Computer Services Co. OSI Laboratory and the General Motors Corp. MAP Laboratory.

The company also said it expects to introduce an interface product later this year that would allow its Network File System to run on top of Sunlink OSI. The Network File System, software that allows users to swap files transparently in a multivendor environment, is currently supported by more than a dozen vendors.



Vendors link into IBM mainframes

From page 19

the X.25 standard.

NCR Comten, Inc. announced an X.25 software interface that runs on its IBM mainframe front-end processors. At Interface, the company announced that it would be reselling a series of X.25 switches from Telecommunications International, Inc., starting at \$23,000. According to company spokeswoman Michele Wolfe, NCR Comten intends to expand its SNA offerings with a full range of X.25 products.

Three X.25 networking companies announced offerings that permit IBM users to access their services. Tymnet/McDonnell Douglas Network Systems Co. announced SNA/Synchronous Data Link Control (SDLC) support for its Async-3270 services. "This allows customers to use Tymnet as a personal computer-to-mainframe link for \$8 to \$10 per hour as opposed to spending \$15,000 for a cluster controller," said Tymnet's IBM product manager Mary Chalmers.

GTE Teletel Communications Corp. introduced IBM's SDLC and 3270 bisynchronous private dial ser-

vices on its packet-switching network.

And the preceding week General Electric Information Services Co. announced IBM 3270 SNA/SDLC access to its IBM-based Mark 9000 service and packet-switching service Mark Net.

According to Jeffrey Held, group manager of data communications networks at Fairfax, Va.-based consulting company Network Strategies, Inc., leased lines are more cost-effective than packet-switching services when it comes to traditional high-volume terminal-to-host connections. But he added that the services provide cost savings when it comes to linking remote sites whose data traffic is too low to justify a leased line and providing IBM host access to PC users who spend only part of their time in 3270 emulation mode.

Competition vs. connection

From page 19

Georgia Bell and Florida Bell. Other local and regional telephone companies, such as Pacific Bell, are waiting for Federal Communications Commission approval to offer such services.

Meanwhile, on another part of the floor, intervendor competition continued to block industry-wide consensus on personal computer-to-personal computer error-checking protocols. A universal standard would greatly facilitate communications among different vendors' personal computers, modems and services. Unfortunately, Tymnet/

McDonnell Douglas Network Systems Co.'s X.P.C. and Microcom, Inc.'s Microcom Networking Protocol (MNP) are still battling it out.

According to Microcom product manager Ed Brohm, at a recent meeting, the Consultative Committee on International Telephony and Telegraphy (CCITT) had already put aside X.P.C. partly because the protocol only works for asynchronous modems. "Everyone but Hayes Microcomputer Products, Inc. has MNP," Brohm said.

Tymnet/McDonnell Douglas spokeswoman Lori Waggener said the "fight was not over." Waggener added that a Microcom representative had called the CCITT meeting without inviting Tymnet/McDonnell Douglas representatives and that the issue would be debated in subsequent meetings.

Multivendor net manager pending

From page 19

puters, the program uses artificial intelligence procedures to determine the most likely reason for a network problem and to recommend a solution. "For instance, Net/Advisor could tell you the problem is either a port on the front-end processor, a matrix switch and recommend that you begin by rerouting the circuit in the matrix switch," Hunter says.

The complex for one third-party vendor

Dixon Doll, chairman of Ann Arbor, Mich., consulting company DMW Group, Inc., says that Avant-Garde is addressing "a problem the network industry has to come to grips with" but suggests that a "generalized multivendor network management system" is too complex a job for one third-party vendor.

"Each vendor uses proprietary addressing schemes and diagnostic techniques. There can be no integrated approach for isolating faults over an entire multivendor system unless vendors cooperate," Doll says.

One hopeful development is a third-party program that IBM has been hinting about whose purpose is to persuade network vendors to implement net management standards.

While details are not finalized, Doll expects later this year IBM will publish specifications for a standard that enables different vendors' systems to send diagnostic data to an IBM host's Network Communications Control Facility. Doll adds that "IBM's push for standards should result in products that can be used outside of IBM environment. It won't take responsibility for developing multivendor products but instead will hand the job on to companies like Avant-Garde."



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SYSTEMS & PERIPHERALS



HARD TALK
Peter Cooperstein

Disk drives that slipped

Since the arrival of IBM's newest 3390 disk units — the single-density AD4/BD4s and the dual-density AE4/BE4s — we have witnessed some interesting occurrences in the disk drive marketplace. One major development has not gone according to script, and a widely accepted forecast will prove to be off the mark.

The AD4/BD4 machines have replaced the old AA4/BO4 single-density disk drives in IBM's product line. The "A" in AD4 refers to the first unit in a string of disk drives, which may include up to three "B" units. The newer drives perform slightly better than what they replaced, but the real reason they are so overwhelmingly popular is that they can be upgraded to the dual-density AE4/BE4s. These dual-density drives offer more capacity for the dollar and — most important to many users — more capacity in the same floor space.

Once IBM made the AD4/BD4s widely available, the value of the older AA4/BO4s hit the skids. This surprised no one. The advantages of the AD4/BD4 units hampered the value of the older machines. What was unexpected about the decline is that the AA4 has dropped far more than its BO4 mate.

In the past, the values of used "A" and "B" models of other IBM disk drives have fallen fairly proportionally. The "A" has more intelligence built into it and thus is typically more expensive than the "B" of equal capacity.

See **DESK** page 27

Cooperstein is vice-president of marketing for Western Marketing and Financial Corp., a San Rafael, Calif.-based leasing and brokerage firm.

Supermicro net preferred

User opts for Plexus units instead of DEC mid-size

By Donna Rainoldi

MINNEAPOLIS — A team of software engineers at Rosemount, Inc. in Minneapolis has found a local-area network built around four Plexus Computers, Inc. supermicros and Ethernet more powerful and reliable than a similarly priced mid-size minicomputer.

Rosemount manufactures process control systems that are used by laboratories, factories and refineries to monitor and regulate environmental conditions. The company's 11-year-old Digital Equipment Corp. PDP-11/45 was overloaded to the point where response time was slow, the system crashed often, and programs had to be compiled at night so they would not tie up the system during working hours.

Rosemount was about to purchase a DEC VAX-11/780 when a senior engineer saw the Plexus machines at a trade show, convinced his coworkers to run tests on the Plexus and compared the results with an in-house VAX-11/780.

Criteria for a new system included fast downloading to a half dozen Motorola, Inc. workstations that are kept in a laboratory,

handling of large complex and achieving better response times than the company was getting on its PDP-11, which had 128K bytes of memory and a 300M-byte disk drive. The staff was also concerned about preventing the sporadic downtime and catastrophic machine failures that they experienced with the old machine, says Jim Kirby, engineering manager of digital development. Downtime meant that nobody worked, he says, because not only is all software development performed on-line, but specification writing and documentation tasks are performed on-line too.

The company purchased two Plexus P/35 systems and two P/60 systems. Each P/35 has a 72M-byte disk, and the P/60s each have two 220M-byte disks. Disks, like other peripherals, are shared among systems.

Since installing the networked supermicros, the company found that its computer power is triple that of a similarly priced VAX-11/780. And, unless the primary power goes down, the company still has three-quarters of the system intact, Kirby says.

One of the P/60s was allocated to 15 occasional system users in the marketing, research and development departments while the other P/60 and both P/35s were reserved for software development effort.

See **USER** page 27

INSIDE

Sperry introduces a more compact tape subsystem for its Series 1100/28

Flexible Computer adds a Motorola 68020 processor to its Flex/32 Multicomputer 26

NEW THIS WEEK

■ Honeywell offers four packaged systems for factory data collection

■ For more on this and other new products, see pp. 73-93.

INSTANT ANALYSIS

"The question that IBM has to address is what to do with its System/34 users. I think the standard pattern is going to be a migration from the System/34 to the System/38 after the next release of CPF."

— David M. Andrews, president, Andrews, Duerr & Mantegazza consultancy

CIE Systems introduces two versions of its CIES 680/250 high-end multiuser system

By Rosemary Hamilton

IRVINE, Calif. — CIE Systems, Inc., a subsidiary of C. Itoh Electronics, Inc., has introduced two versions of a high-end multiuser system that can support up to 64 users.

The CIES 680/250 APX runs under the Pick Systems Pick operating system and the CIES/30-25 runs under RM/COS, which the company said makes the system compatible with the Texas Instruments, Inc. Business Systems Series.

Both systems are based on the Motorola, Inc. 68020 microprocessor. The entry-level system supports up to 24 users, comes with 2M bytes of main memory and 337M

bytes of disk storage. An entry-level 680/250 APX sells for \$58,995, and an entry-level 680/30-25 sells for \$56,900. Both are scheduled for shipment this month.

The 680/30-25 was designed to compete with T1 systems running under DX10. A DX10 shell was built into the RM/COS operating systems, allowing users to migrate their software to the CIES system, a company spokesman said.

Upgrades from the vendor's smaller systems, the 680/100, 680/150, and 680/200, will be available. While complete details are not yet available, a CPU exchange would cost approximately \$5,000, the spokesman said.

Applied Digital Data Systems unveils latest Mentor models

More Protege software, two printers added

By Donna Rainoldi

HAUPPAUGE, N.Y. — Applied Digital Data Systems, Inc. (ADDS) has rolled out new models of its ADDS Mentor multiuser business computer systems. The Pick Systems' Pick operating system-based units will be joined by a new release of the Protege networking software and two models in a series of printers.

"In the past, ADDS has had a narrow focus as far as the size of their machines, and they appear to be trying to broaden their product line on both ends now," said Chandru Murthi, Pick system consultant with

Opsys Consultants in San Francisco. In the other-than-IBM Personal Computer-based Pick marketplace, ADDS is about No. 3, following McDonnell Douglas Computer Systems Co. and Ultimate Corp., he said.

All of the new systems include office automation and application generator software. The QA software includes packages such as data base management system, word processing, spreadsheet, electronic desk diary, electronic mail and desk calculator. Murthi said the ADDS Mentor systems are not primarily office automation systems, however. He said they are business application systems — most commonly financial applications — for companies in the \$2 million to \$100 million revenue range.

The entry-level 1700 series increased by two models. The 1720 three-user system, including 512K bytes of random-access memory (RAM), one parallel printer port, 1.2M-byte flexible disk drive, a 20M-byte hard disk and three RS-232 ports, costs \$8,500. The 1740, which can be expanded to up to eight terminals, costs \$14,000. It includes a 40M-byte disk, eight RS-232 ports and a 4-in. streaming tape drive.

ADDS also announced a high-end member in its Mentor 2000 line. The 2580 comes with up to 132M bytes of disk storage capacity, compared with a maximum of 80M bytes on existing 2000 line systems. The system, with 512K bytes of RAM, a parallel printer port, a 16-port terminal controller, one 60M-byte disk drive and a 4-in.

streaming tape drive, costs \$27,000. Upgrades from two smaller Mentor 2000 systems — the 2533 and 2550 — are available for \$9,000.

The Mentor 5500-11 is the first ADDS Mentor system to offer 1G byte of disk storage, the company said. It features four 270M-byte formatted drives with four-way disk overlap Seek and supports multiple 4-in. dual-density 1,600/3,200/bpi in. tape drives. The system, which ranges in price from \$75,000 to \$100,000, will support from 32 to 64 users. It uses Release 2.3 of the Mentor operating system, which provides an extended precision arithmetic and 20% performance improvement, the vendor said.

A new version of ADDS Protege software allows the Mentor 1000 sys-

See **ADDS** page 26

SYSTEMS & PERIPHERALS

Flexible Computer adds second processor to Flex/32 system

Motorola 68020 makes more software available

By Donna Reinhardt

DALLAS — Flexible Computer Corp. is scheduled to announce a real-time 32-bit computer for its parallel Flex/32 Multicomputer system today. The C2C computer can be added to the C1C National Semiconductor Corp. 32032-based processors already on the Flex/32 system, the vendor said.

The C2C uses Motorola, Inc.'s 68020 processor and Motorola's 68881 floating-point unit to provide both scalar and vector capabilities. A 1M-byte C2C processor costs \$40,000, and a 2M-byte model costs \$48,000.

The 68020-based processor is not a new idea for Flexible, said analyst Omer Serlin of Los Altos, Calif.-based

Item International. The company promised two years ago to add the chip to its product because the 32032 processor that it started with was limited by the amount of software made to run on it, Serlin added. The 68020 will give users more software from which to choose, he said.

'Should run as well, just faster'

John Rice, head of the computer science department at Purdue University in West Lafayette, Ind., does not anticipate problems with the older, slower processors and the C2C working together. "The test is to do it, of course, but the new one should run as well, just faster," he said. One of the experiments he will run will

give more work to the faster processor while all processors are running concurrently.

Each computer in the system contains its own operating system and a 32-bit Motorola VMEbus interface for I/O and memory. All memory can be accessed by all computers in what the vendor refers to as a multiple instruction stream/multiple data stream/multiple I/O stream environment.

Lawrence Samarin, Flexible's chairman of the board, claims that the number of computers that can be linked in a Flex system is infinite. The largest system built to date, however, is a 20-computer model at the National Aeronautics and Space Ad-

ministration's Langley Research Center in Virginia.

According to Serlin, the system has been accepted in universities and NASA installations where people are experimenting with parallel machines.

A two-processor Flex/32 system costs approximately \$88,000 using C2C processors or \$86,000 using the older C1C processors. For a 20-processor model, prices range from \$650,000 to \$850,000.

Besides the Unix software development environment, the system supports Flexible's multicompiling multitasking operating system, which is automatically invoked through the system's high-level languages.

Sperry enhances tape subsystem

BLUE BELL, Pa. — Aiming to reduce the amount of floor space used by tape drives by 40%, Sperry Corp. has announced its Uniservo 36 II tape subsystem.

The Uniservo 36 II is intended for use with Sperry's Series 1100 mainframes and offers a smaller size, improved reliability and reduced power consumption, compared with its predecessor, the Uniservo 36, according to Sperry officials.

The Uniservo 36 II operates at 200 in./sec. with a 1.2M-byte transfer rate, offers phase-encoded and group-coded recording and is compatible with Federal Information Processing Standards 60, 61 and 62. It can be configured with up to two Model 5042 II controllers and 16 tape stations.

A subsystem with a control unit and a tape drive costs \$56,690 or can be leased on a five-year agreement for \$1,575 per month.

Additional tape drives cost \$25,000 or can be leased for \$694 per month. The transistors, fewer costs \$1,785 or can be leased for \$50 per month.

ADDS unveils Mentor models

From page 25

tem to be used as a Mentor terminal with the added capability of transferring and sharing files and data between the Mentor operating system environment and the Microsoft Corp. MS-DOS environment. Protege II incorporates comprehensive on-line windowed Help screens, improved function key programmability and a menu editor. It costs \$300.

Two band printers, the LP-4 and LP-8, were also introduced. They operate at 300 and 600 line/min., respectively. The LP-4 costs \$7,000; the LP-8 costs \$9,000.

YOU DON'T HAVE A COBOL PROGRAM SO PATCHED AND TANGLED IT CAN'T BE STRUCTURED AUTOMATICALLY.

Until recently, there were only two ways to deal with the patched-up, hand-me-down, unstructured COBOL programs that consume up to 70 percent of your company's software effort.

You could continue to live with the old programs, patching and mending as best you could. Or you could scrap the programs, at enormous cost and disruption, in favor of an entirely new system.

But now there is a third alternative. COBOL structuring. The advantages of this alternative are enormous. Among them, the ability to reduce maintenance costs by 50 percent by more effectively using your programming resources.

The technological leader in COBOL structuring is Language Technology, Inc. In fact, of the very few companies who claim to have a COBOL structuring solution at all, Language Technology is the only one with a system, called RECODER,

that is fully automatic. The others automate only a portion of the structuring task, leaving the really tough parts to be done manually, over a period of weeks or more, by trained experts, who, because they are human, will make mistakes.



The benefits of structuring are illustrated in this example, representing the costs of adding 3000 lines of new code to an unstructured program of 10,000 lines, as compared to adding the same number of lines to the same size structured program.

Based on proprietary language processing techniques and pioneering research in graph theory, RECODER has reduced the tremendously complex mathematics involved to a provably correct solution so complete that it does not force you to accept its own style of structured code. You can select the level of nesting, type of operators, complexity of expressions, formatting style, representation of procedures, and many other features that might be required by your own in-house standards.

RECODER, available as a service or by license, can automatically structure thousands of lines of COBOL in minutes, without the necessity of adding

SYSTEMS & PERIPHERALS

User prefers supermicro net

From page 25

forts, Kirby says.

Because Rosemount's PDP-11/45 ran under Unix and the new systems that run under Unix, the conversion of existing software was fairly simple, reports Cary Yamanaka, principle software engineer and supervisor of the software group.

Stations get direct access to disk drives

The network provides all stations with direct access to disk drives, printers and modems, Kirby says. Users can communicate with each other via the Unix electronic mail facility, transfer files and perform remote op-

erations from their work areas.

To access files from any networked workstation and to run remote compiles without having to go through lengthy setup procedures, the company uses Plexus' network file system to create a main library that contains the files from all four Plexus machines. Partial daily and full weekly backups ensure that the library is kept current.

The date- and time-stamping facili-

ties of the Unix source code control system allow only one user to modify a file while others can read it at the same time.

Once modified, the file is returned for the next person to use. After Unix updates the file, all the changes are logged in sequence, Yamanaka says.

The staff modified the network to allow users to access all files on the network as if they resided locally.

Security is not a problem, accord-

Downtime means that nobody worked because not only is all software development performed on-line, but specification writing and documentation tasks are performed on-line too.

ing to Kirby.

"We don't restrict anybody in this group — they either have a pass or they don't," he adds. The company does use security measures on its outside lines through which the engineers access the computers from their homes.

Utility automatically sends code

Rosemount created a utility that automatically sends code to be compiled to a predetermined time and provides status on the job until it is completed.

Programs are still compiled at night to avoid slow response times, but that would have been the case had a VAX-11/780 been bought too, Yamanaka says.

"I'm not claiming our system is better than a VAX — all I'm saying is it works for us," Kirby says.

consultants or any new people to your staff or of requiring any new skills of the people already on it. And, RECODER can do it with a cost effectiveness that will allow it to pay for itself within a year.

Because you hear a lot of promises from a lot of software companies, we can understand if you are skeptical about what we say we can do. That's why we want you to know that RECODER has been cutting its teeth on real world COBOL for four years now, successfully structuring millions of lines for such forward-looking companies as Federal Express, Hartford Insurance, Phillips Petroleum, and TRW. That's also why we

Disk drives that slipped

From page 25

Used prices normally reflect that difference, but in this case supply and demand clearly has taken over.

The AA4 is only appropriate when beginning an additional string of older boxes. However, the B04s have remained in higher demand to complete existing strings that have not reached their limit of B04 devices.

The B04's current value is well above that of the AA4. Many dealers won't sell a B04 without an AA4.

What will these drives be worth in the marketplace? Industry forecasts suggest that in three years the older 3380s will be worth approximately 10% of the current IBM list price, while projecting the newer single-density models to be worth four or five times that. Although this big a difference makes sense for today's market, there doesn't seem to be any solid reason for such a difference three years or more down the road.

Only two considerations could account for such a price variation, neither of which, I believe, will come to pass.

• There is always the possibility that IBM could announce performance enhancements only for the newer devices — faster channel speeds, perhaps, or compatibility with forthcoming IBM products. But since the same forecasters foresee IBM shipping an entirely new generation of disk drives as early as 1988, such enhancements seem unlikely.

• The newer models perform only slightly better than their predecessors, so a value difference might be based on the ability to upgrade to the dual-density AE4/BE4s. Although much upgrading to these dual-density drives may occur in the next year or two, beyond that, IBM's upgrade price will become relatively too high. Users of IBM 3081 processors can double capacity by upgrading to 3084s, but they currently find adding another used 3081 or installing a new 3080 to be better alternatives. So it will be with the 3380s.

This analysis leads to the conclusion that, as investments, the 3380 AD4/BD4 models are overrated. I suggest that potential users take advantage of unwarrantedly low leasing rates before the companies behind them see the light.

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So who needs all that speed? You do. If you want to optimize your VM operations, stay out of needless DP traffic jams, and make the boss happy with your throughput.

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(2) **EASY HANDLING:** SYBACK and SyncSort CMS are among the most flexible, user-friendly programs ever produced by anybody anywhere. That's one reason programmers love 'em. And where does it say that backup and sort operations have to be hard to be good?

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If you'd like to put a little high technology in your VM tank, give us a call. We might even take your used VM dump-restore or sort program as a trade-in!

SOFTWARE & SERVICES



SOFTLINE
Frank Sweet

Design by any other name

One of the tools used to speed applications development is prototyping, but its advocates have come to use the term to mean several different approaches.

Consider these flavors of prototyping: data-driven design, database screens, iterative development and doing it twice.

Data-driven, as opposed to function-driven, design addresses how we attack the problem. We can design an application primarily around the data structure it supports, or we can shape it to model our user's business processes. Both approaches have been around for at least 15 years. The Jackson methodology pioneered data-driven design. Functional decomposition played the opposite role.

At the data-driven extreme for an on-line system we build one screen for every entity-to-entity relationship. The first screen lists vendors, the next shows a vendor at the top and lists his purchase orders at the bottom, the next shows one purchase order and lists its line items and so forth.

At the other extreme we deliver one screen for each business transaction, regardless of the number or types of records affected. Data-driven designs are less vulnerable to organizational and policy changes. Procedures change. Data entities don't. Function-driven designs, on the other hand, make the system fit the user.

Many experts are leaning toward the data-driven approach, de-emphasizing functional decomposition. Two factors led to the trend.

First, the data base boom of the past 10 years spawned hundreds of shops. See **DESIGN** page 31

Sweet is an independent data base consultant in Jacksonville, Fla., who also publishes "Boxes and Arrows," a monthly newsletter for IBM DBMS users.

Prototyping, ADS/Online join to triple productivity

AT&T Communications speeds development process

By Charles Babcock

CINCINNATI — DP managers at AT&T Communications say they have made productivity gains of three to one by using application prototyping in combination with the Cullinet Software, Inc. ADS/Online development language.

Tripling the productivity rate was the average gain for 15 communications applications developed over the last 18 months, says Richard K. Ash, district manager for AT&T Communications' data center in Cincinnati. In some cases applications were developed twice as fast, while in other cases they were created five times as fast.

In addition to the 15 applications now in production, another 16 have been developed using both prototyping and Cullinet's development language, and while AT&T has not done a quantitative analysis of the

productivity gain, Ash thinks the three-to-one average applies to them as well.

"Prototyping really works. The feasibility study, definition and preliminary design are collapsed into a single step," Ash says.

It is like building "a straw man," he adds. "You put a series of screens up there that helps people focus on how the application will run."

AT&T Communications set a productivity increase of 30% as the minimum needed to justify retraining and the expense of the new tools. To see if it met that criterion, Ash's department used a procedure recommended by IBM, function point analysis, to measure its gains.

Function point analysis attempts to define standard transactions and business functions within an application and record how long it takes to program them, explains Roger A. Krantz, manager of information management at the Cincinnati center. While there is no one definition of

See **PROTOTYPING** page 30

NEW THIS WEEK

- Lisp Machines offers object-oriented programming paradigm
- Quintus ports Prolog development system to IBM RT PC

■ For more on these and other new products, see pp. 73-93.

INSTANT ANALYSIS

"Prototyping really works. The feasibility study, definition and preliminary design are collapsed into a single step."

— Richard K. Ash, district manager, AT&T Communications, Cincinnati

SOFTWARE NOTES

GE wins contract to streamline Ada

General Electric Co. has been given a three-year, \$2.6 million contract by the U.S. Air Force to help develop a special program that will streamline the U.S. Department of Defense's Ada language. The goal of the project is to shorten the time required to write Ada programs by a factor of 10, said Roland W. Schmitt, GE senior vice-president for research and development. The GE software will incorporate special editors and routines that enable programmers to "fill in the blanks" and "program with pictures."

Digital Equipment Corp. has announced a supported version of VAX LISP for its Ultrix-32 and Ultrix-32M operating systems, the DEC Unix operating system derived from the University. See **NOTES** page 31

ADR extends Vollie to PCs

By Douglas Barney

PRINCETON, N.J. — Applied Data Research, Inc. (ADR) has announced Release 3.5 of ADR/Vollie, an on-line program development system for DOS/VSE environments, which features personal computer support, access to VSE/SP2.1 libraries and a dynamic logon facility.

Vollie now fully supports the ADR/PC PTE personal computing tool for applications programmers. ADR/PC PTE allows data to be created and maintained on personal computers and automatically transferred between a mainframe and personal computer.

Although previously a mainframe product, the PTE interface allows ADR to extend the Vollie environment down to personal computers," said Gregory Walsh, product manager for Vollie.

Shifting development to a personal computer reduces contention for mainframe resources and improves response time for

See **ADR** page 30

Bright

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SOFTWARE & SERVICES

ADR extends Vullie to PCs

From page 29

the developer, Walsh said.

With ADR/PC PTE, the only time a developer has to be connected to the host computer system is when uploading or downloading, according to Walsh.

Security, controls maintained

In addition, all mainframe security and controls that have been established through Vullie are maintained when using ADR/PC PTE, and the source management facilities of ADR's The Librarian are also supported.

ADR said it expects that 20% to

25% of its 2,500 existing Vullie customers will be interested in the system.

Another new feature of Vullie Release 3.5 is dynamic logon. Rather than uniquely defining each terminal, the same entry can be used for any terminal in a pool.

Dynamic logon allows terminals to be installed and operational more quickly and also reduces IBM CICS storage requirements, according to Walsh.

Expanded support for VSE/SP2.1 library

Another feature is Vullie's expanded support for the VSE/SP2.1 library, which enables users to directly copy members from the system library into Vullie's Online Library to be modified or displayed.

Directories of SP2.1 libraries are said to be created and displayed at a

Vullie terminal.

Vullie Release 3.5 is currently available for the IBM 370, 3080, and 4800 mainframe computers and plug compatibles for a permanent license price of \$20,600.

Customers can also receive six-month, three-year and five-year term leases.

Vullie users can purchase ADR/PC PTE for \$195 per copy, with a \$6,500 one-time site license charge for the mainframe code for uploading and downloading.

ADR/PC PTE runs on the IBM Personal Computer, Personal Computer XT, AT and the 3270 Personal Computer, with 256K bytes of random-access memory and a Digital Communications Associates, Inc. Irma board or compatible.

No hard disk is required. The product is available now.

Prototyping, ADS/Online join

From page 29

function points, they can serve for purposes of comparison as long as programmers define them the same way through multiple projects, he says.

Under previous procedures, it took an average of 33.2 hours per function to develop IBM Cobol applications over 140 projects. With prototyping and ADS/Online, this average was cut to 11 hours per function for the 15 production programs, Aeh says.

In addition to combining the feasibility study, requirements definition and preliminary design, prototyping accelerates the development process in another way. It imposes close communication between the people developing the application and the business user, Aeh explains.

Instead of putting a ahead of specifications into the user's hands and asking him to sign off on them, the developers construct a prototype, a series of screens that highlight the steps of the application, Aeh says.

The user reviews the screens to see whether they accomplish the business task the way he intended. During the review, he can suggest that fields be painted in different areas of the screens, screens be added or arranged in a different order.

"With paper specifications, you don't get that same feeling that you do with a prototype. It's the difference between reading about a car and going to the showroom and taking it out for a test drive," Aeh says.

'Prototyping saves reworking'

In addition, developers can put a prototype into the hands of the user more quickly than they can build a finished application. In the past, a programmer might "disappear for 10 or 12 months to work on an application. When it was ready, he would show it to the user, who might respond, 'No, that's not it.' Prototyping saves reworking further down the line," Aeh says.

After an acceptable prototype has been constructed, programmers go to work to write ADS/Online code that ties the screens together and builds in functionality.

Although both prototyping and ADS/Online coding speed application development, it is difficult to break down where the gains of the one end and the other begin. "My gut feeling is it's about 50-50," Aeh says.

AT&T selected the Gullnet products — ADS/Online, IDMS and Online Mapping Facility — after reviewing several competitors, including Cincom Systems, Inc.'s TIS/Mantis and the French firm C. G. I. Systems' Pacbase.

AT&T starts the prototyping process by putting the developers, program analysts, end users and systems designers into the same room together for a week to talk about what they are trying to accomplish. The end user continues to talk to the developers as he reviews the prototype, and when the process is completed, the technical and business people have a better appreciation of each other's role, Aeh recounts.

For that reason as well as speed, prototyping is now a standard development method at AT&T Communications, he notes.

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service to back them up. Because we know that those things help just as much in making your system run smoothly.

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SOFTWARE & SERVICES

Design by any other name

From page 29

with central data pools shared among applications. At such sites data maintenance becomes independent of information extraction, and the two functions are often performed by different user groups.

Second, data-driven design is often faster. We can derive screen flow from data structure directly and skip functional analysis. The opposite approach, in contrast, cannot avoid data structure analysis.

Regardless of which you choose, it's useful to recognize that some writers refer to data-driven design as prototyping.

A second use of the term applies to delivering an application's shell — dataless screens — before coding its data access. With modern screen generators, such as IBM's DMS or Cullinet Software, Inc.'s ADS/Online, it is much easier to program screen appearance and screen-to-screen flow control than to write the underlying data manipulations.

An alternative is to sketch the screens on paper before programming anything — appearance or data handling. Screen sketches have the advantage of being inexpensive.

Hence, iterations of "Change this. . . No, put it back!" use a lot of eraser and a little patience but no programmer or computer time.

The problem is that customers, who have difficulty finding time to read documentation, sign off blindly and begin requesting changes after the application is delivered — a catastrophically expensive approach.

The strength of dataless screens is that they are real and command attention. Even busy users will often spend hours pushing buttons, learning what they can do and requesting changes on the spot.

The notion's weakness is that user experimentation is limited to switch-

ing from one screen to another. Since there's no program behind the screen, one can neither scroll through pages of data, select records for detailed display, search on partial keys nor update.

Either way, dataless screens and sketches must both eventually be produced. The sketches are needed for the instruction book. Dataless screens are an intermediate development step even if the user never sees them. At issue are simply which comes first and which is the instrument of interactive change.

The third prototyping flavor deals with iterative development vs. doing it right the first time.

In contrast, some tools avoid the entire problem. They make application building so inexpensive that there is no final application delivery. One shop generates ADS/Online pro-

cess code out of off-the-shelf stock paragraphs by using a word processor. Here, a typical screen program — supporting one record at screen top, a list of subordinate records at screen bottom and dozens of functions — is produced in minutes once we identify the modules we need. Such programs are seldom changed; they're simply regenerated with new parameters.

This means we can afford to do it over until we get it right. We deliver a completely finished application — Version 1 — collect a couple of days' worth of change requests and generate it again — Version 2. We repeat the process until changes taper off, then report system delivery even though it may be Version 23 and has been in use for weeks. Many call this, too, prototyping.

Finally, some propose doing every

application twice: once to learn on and once to keep. "After all," they assert, "we usually wind up doing that anyway." We build and deliver a trial application using programmer-efficient tools. Then, once we're sure the user is satisfied, we rewrite it using machine-efficient ones.

The idea has two flaws. First, it seems a shame to write all those programs twice. Few shops can realistically afford the second step. Second, in addition to reprogramming the application, we may have to move megabytes of painstakingly collected business information from one data base to another.

Many thus agree that "prototyping" is the key to success. But some forms are more successful than others, and we have yet to find one method so workable that we agree on what the word means.

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Notes: Focus VS version debuts

From page 29

ty of California at Berkeley's Unix Version 4.2. VAX LISP is DEC's version of Common LISP, an artificial intelligence language. VAX LISP allows integration of both AI and conventional software.

Information Builders, Inc. of New York has ported its Focus fourth-generation language and data base management system onto the Wang Laboratories, Inc. family of VS minicomputers. The VS version adopts CRT screen attributes familiar to Wang users, according to Gerald Cohen, Information Builders' president.

Oracle Corp. of Belmont, Calif., has announced the formation of a national consulting practice to work with governments and corporations in developing applications for the Oracle data base management system, fourth-generation language and decision-support tools. The practice will be based in Boston.

Guess who just won two record breaking contracts every software company would give its eye teeth for?

**Enable.
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On Monday, February 24, following a hotly contested 10-month competition, the IRS announced one of the largest integrated software/hardware contracts ever granted: 15,000 laptop computers, each one with Enable, from the Software Group.

Now, for the first time, every IRS field auditor will have laptop power to access home office mainframe data, search records, revise tax statements, and turn out final reports. On the spot.

On Friday, February 28, following what may be the most rigorous selection and testing process ever conducted, the U.S. Air Force awarded an even larger contract for microcomputer software and hardware. Again, the integrated software chosen was Enable.

Now, for the first time, The Air Force (and the Army and the Navy) will have a flexible, easy to learn, multifunction system that can be customized to handle an incredibly wide range of needs.

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MICROCOMPUTERS

Dan Bricklin Demo speeds prototyping via simulation



SMALL TALK
Eric Bender

Some shifting Lotus positions

Looking out over the crowd of corporate users and third-party software firms, Lotus Development Corp. President Jim Manzi likened it to an extended family. Then he added wryly, "Why, you might ask, didn't we write sooner? Or, as my mother used to say, 'Why didn't you at least call?'"

More users group meeting than technical gathering, the first Lotus developer conference particularly pleased the third-party vendors as the first sign that Lotus had acknowledged their existence.

In addition to add-in tools for 1-2-3 and Symphony, Lotus also disclosed plans to publish the graphics output file formats for those packages — good news for firms creating presentation graphics software.

For corporate users, last month's conference showed some good faith efforts to address their problems. Lotus officials also renewed some promises that have been on the books for a long time.

However, they produced few signs of progress in one key area: delays on the technical support lines. Lotus now has more than 1.5 million users who have invested 22 billion hours in its products, the company estimates. With those kind of numbers, it's no big surprise that technical support brings so many complaints. But attendees said they would like to hear some more details about how Lotus is tackling the problem.

The sheer size of the user base explains.

See **DBMS** page 37

Bender is Computerworld's senior editor, microcomputers.

By Rosemary Hamilton
NEWTON, Mass. — Dan Bricklin, co-developer of Visicalc, is at it again with a one-man shop called Software Garden, Inc. And his new company apparently has a hit on its hands with the Dan Bricklin Demo Program, a prototyping tool for personal computer software that has won rave reviews from early users.

"If the Demo program hadn't come along, we would have eventually been forced to do something similar ourselves," said H. L. Hendrick, managing director of Productivity Plus, a systems house in Palo Alto, Calif.

While Hendrick and some other users recently interviewed by Computerworld complained about the software's skimpy manual and lack of bit-mapped graphics, they also said that these problems are minor because the overall product greatly speeds their development work.

Demo allows users to create simulations of programs or tutorials for programs. Put simply, users can type in sketches of what they would want a program to look like and make changes as they create, instead of writing and then rewriting code.

Users actually create a series of slides that mirror a software program. Demo's run mode then allows users to present these slides in sequential fashion and to simulate functions, such as menu selection, giving the illusion that an actual program is running. A slide can be made from scratch or it can be captured from another program, such as Lotus Development Corp.'s 1-2-3 and merged into Demo. This capture function was designed for presentation or tutorial work.

Skeptics have claimed a prototyping product such as this could provide people with an easy means of creating so-called vaporware. "You actually could make a product before it exists," said Dawna Paton, a Demo user at Pugh-Roberts Associates, Inc., a management consulting firm in Cambridge, Mass. "You could take it to Q&A and show them. And they might not realize it was a simulation. But it's up to the person getting the demo to find out if it's real or not."

"Vaporware will always be a problem, and not more so because of this product," Bricklin responded. "Maybe if it becomes

See **DBMS** page 36

Graphics interface spec proposed

By Edward Wimmer
Computerworld News Service

MENLO PARK, Calif. — Several major companies in the personal computer industry met last month to endorse a graphics interface specification that they hope will become a standard for IBM Personal Computer graphics boards and software. Should the standard take root, its supporters said, the IBM Personal Computer may become as graphics oriented as the Apple Computer, Inc. Macintosh is today.

Currently, software developers typically must write separate device drivers for each of the various graphics boards with which their programs will interface. That time-consuming process discourages the

use of graphics by programmers, according to Kim DeWint, silicon program manager at Graphic Software Systems (GSS), the developer of the Direct Graphics Interface Specification (DGIS).

The DGIS, she said, would be placed in read-only memory on the graphics interface board itself, and programmers would need to write only a single device driver to support a number of different boards.

This setup would also speed graphics processing and free space in the graphics software for other functions, said a spokeswoman for Borland International, one of the firms that joined GSS at the unveiling of DGIS.

See **SPEC** page 37

INSIDE

IBM announces a short-card 3278/3279 emulator/36

NEW THIS WEEK

- Texas Instruments adds features to the Business Pro system
- Intech enhances Excelerator and offers new versions
- For more on these and other new products, see pp. 73-83.

INSTANT ANALYSIS

"Everything has to come together, and the coming together is going to take longer than what I hear as the consensus opinion. . . . And the overall rate of adoption is going to be slower."

— Mitchell Kapor, Lotus Development Corp. chairman, on next-generation software

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Oracle unveils productivity tools for SQL/RT on the IBM RT PC

Oracle Corporation has announced six software products for the newly-announced IBM RT PC system. The packages run with IBM's SQL/RT relational DBMS, which was developed by Oracle for IBM. Oracle also announced immediate availability of its full ORACLE product line on the RT PC/AT co-processor.

According to Oracle Director of Product Marketing, Ken Cohen, "The SQL/RT product which IBM is marketing on the RT PC provides a robust relational DBMS. Since Oracle has been a leader in SQL/RT, we feel well-suited to offer our products directly. They provide even greater flexibility and decision-support capabilities to RT PC users."

SQL/RT. The Pro/Porter precompiler allows RT PC programmers to embed SQL database language statements in the middle of their Fortran programs. It is intended for Fortran programs which must access or manipulate SQL/RT database information.

SQL/SQL. Pro/SQL is a general-purpose call-interface to SQL/RT. Using a simple set of programming calls from a variety of languages supported on the RT PC, the programmer can access SQL/RT.

SQL/IAF. The SQL/IAF (Interactive Application Facility) package is a complete application generator and run-time system for form-based applications. It is a complement and extension to

the Easy SQL/RT component of IBM's SQL/RT.

The SQL/IAF screen painter lets users design forms using what-see-what-get techniques. Multi-table query update forms can be easily produced for demanding applications. Also, SQL/IAF lets users apply data editing and validation criteria to data entered into forms. Finally, SQL/IAF provides extensive support for non-IBM terminal types, such as DEC's VT-220.

SQL/REPT. SQL/REPT is a report writer and formatter for use with SQL/RT. Using simple commands, users can create reports of almost unlimited sophistication from their databases. Database information can also be included in documents formatted with SQL/REPT, allowing text and database processing to be combined in one easy-to-use interface suitable for developers and end-users alike.

SQL/Calc. SQL/Calc is a Lotus 1-2-3 compatible spreadsheet integrated with the SQL/RT DBMS. Users can place SQL statements into the cells of their spreadsheets, retrieving and updating SQL/RT data automatically. Large SQL/RT databases can be shared among spreadsheet users, with all of the database instantly available to them.

SQL/Link. SQL/Link provides a micro-mainframe link which allows intelligent transfer of database information

between SQL/RT on the RT PC and the ORACLE relational DBMS running on IBM PCs and a variety of mainframes and minis.

SQL/Link lets users exchange information between PCs with ORACLE and the RT PC, with the RT PC serving as a Host. The package also lets users of SQL/RT exchange database information with a mini or mainframe running ORACLE.

CP/ODS Support: The ORACLE relational DBMS, 4GL and DSS tools are also available to run on the IBM RT PC/AT co-processor options.

Oracle products and markets the ORACLE relational DBMS, 4GL, and DSS software. ORACLE runs on a wide range of computers, including IBM mainframes, DEC, DG, HP, Stratus and many other minicomputers, and a wide variety of networks, including the IBM PC family.

Oracle distributes its products through a worldwide network of 30 direct sales offices, through the Authorized Oracle Dealer network, and through VARs which participate in the Oracle Alliance program. With its direct and OEM marketing efforts, ORACLE is used by 39 of the top 50 multi-national corporations and a thousands of sites overall.

For further information, contact Oracle Corp., Dept. CWST3, 20 Davis Drive, Belmont, CA 94002, 1-800-345-08MS.

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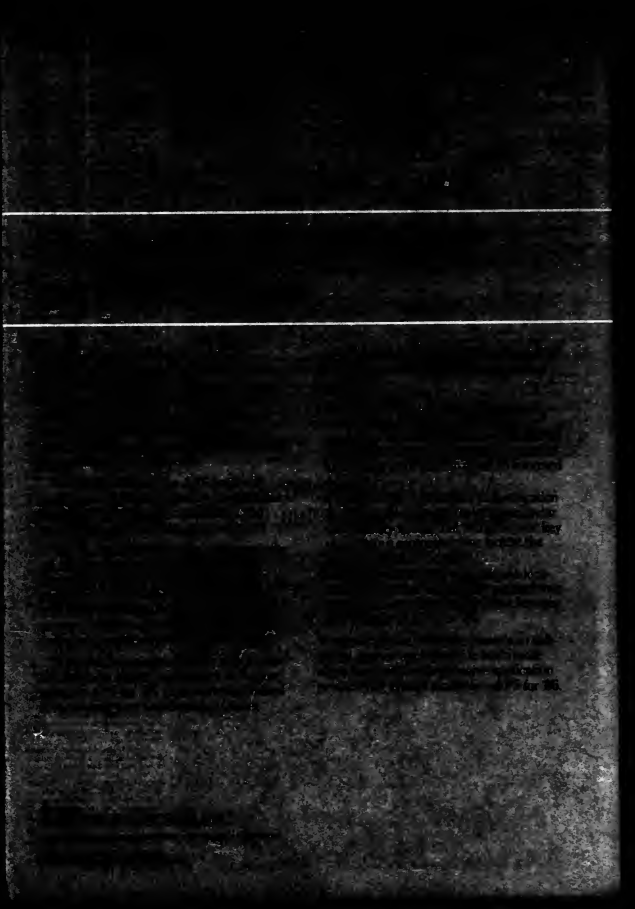
APS VM support facilitates the development of systems in VM that target to the MVS production environment.

VS COBOL II

APS COBOL II support allows users to generate shared re-entrant code using IBM's VS COBOL II compiler.

MVS/XA

APS takes full advantage of MVS/XA, and runs above the 16-meg line. APS MVS/XA support doubles the number of concurrent APS users in an XA Development Center environment.



MICROCOMPUTERS

Demo Program aids prototyping

From page 33

well known, people will be more aware and know to ask if it's a prototype. Besides, I think it's more dangerous when people say their product is 'almost-working code.'"

Bricklin began work on Demo more than two years ago, while still at Software Arts, Inc., a firm he co-founded and then sold to Lotus. After six months consulting at Lotus, he left to go out on his own again. During the last few months of 1985, he worked full-time on Demo.

"This product is one of those where necessity was the mother of invention," Bricklin said. "What's

important is you can make changes on the spot. It used to be you'd go to a programmer and tell him the changes you wanted. If that didn't fit with the design he had in his head, he'd say he couldn't do them. I hope this product brings an end to programs that aren't [designed] from the user's point of view."

At Cullinet Software, Inc., Dave Korona, a software engineer in the personal computer group, has been using Demo to create the user interface for an as-yet-unreleased report writer. Prior to using Demo, the initial design phase — which he did by sketching ideas on paper — would take one week to complete on such a project. With Demo, it took less than two days, he said.

"It's easy to design with Demo," Korona said. "And it's easy to present ideas to the boss. He likes seeing

it rather than hearing about it."

Bricklin offers the product for \$79.95, "because I don't want to give people too much reason not to buy it." Customers have liberal use of the product, although the agreement stops short of a site license. Bricklin allows users to make up to 50 copies of a run demo, which is the product simulation or tutorial, but only one copy of Demo itself may be in use at a given time.

The option of making many copies of the run demo has come in handy for Earnest Karhu, a technical support specialist at the Medlink division of the New England Journal of Medicine. Plans are in the works to expand Medlink — a data base service designed for medical professionals in Massachusetts — outside the state, so Karhu created a demo as a promotional tool.

"This allows me to show people Medlink," he said. "They can get a flavor of it without having to log on." Hendrick of Productivity Plus has used Demo to help create the training modules that his company sells to systems managers. Before Demo, Hendrick would mock up a screen using Satellite Software, Inc.'s WordPerfect but couldn't edit in attention-getting features like different shades of boldface, he said.

Despite Hendrick's satisfaction with Demo, he said the manual was a disappointment. "It's a superb product for the professional, but if you're not, the learning time may be more than you want to spend," he said. In fact, Hendrick has included a copy of Demo in his product for his customers' use and wrote his own version of the manual to accompany it.

"It would help if you had some word processing experience," Hendrick said. "Otherwise, to sit down, use the manual, look at Bricklin's canned demo, change things around, then sit and create just one slide would take you at least a day."

Some advanced users felt limited because the system does not allow them to create bit-mapped graphics. "If Bricklin knew me what he should do next, I'd say, 'Add graphics,'" said Paton of Pugh-Roberts.

But Karhu maintained that while graphics would be a nice added feature, the program "wasn't supposed to be a CAD/CAM package."

Meanwhile, Bricklin's not quite ready to think about adding new features. He's swamped with all the tasks associated with running a one-man shop in his home.

Bricklin runs his own production line — attaching his disettes to slabs of cardboard and plopping them into envelopes. Then he runs downstairs to the front door to leave his mail for United Parcel Service. He runs back up to his office and takes orders over the telephone. He does the billing. And he hopes that users don't need too much support, because he just doesn't have the time.

"I'm not a big company, so I don't want to try and look like one," he said. He plans to hire one or two people for general office work this year. After his time at Lotus, he said, he's glad to be on his own. "I enjoyed being at a big company, but that's not my goal here."

Every year, American businesses lose an estimated \$1 billion due to computer crime. And as personal computers and distributed processing gain momentum, the problem of protecting mainframe computer resources will become even more critical.

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IBM replaces 3278/3279 card

IBM has replaced its standard 3278/3279 emulation card for the Personal Computer family with a less expensive short-card model offering functional compatibility plus additional features.

At \$595, the Advanced Personal Computer 3278/79 Emulation Adapter is priced 34% below the \$895 cost of the previous version. The card fits in either full or half-size expansion slots of an IBM PC, PC XT or AT.

The emulator permits users to transfer files to and from host systems in 3270 data stream environments, according to IBM. The card supports multiple concurrent 3270 sessions or concurrent 3270 and PC-DOS sessions. New options for connectivity to the low-end 4300 systems also are provided.

MICROCOMPUTERS

Some shifting Lotus positions

From page 33

generates the importance of minor headaches like the incompatibilities that came up in the recent upgrade of 1-2-3, according to Lotus Chairman Mitchell Kapor. Only about 4% of users actually ran into difficulty, he said, calling this "a minute problem run through an amplifier of 1.5 megavolts."

Kapor maintained that Lotus has been learning very quickly about upgrade policies and said that "we want to have a very mellow balance of carrots vs. sticks."

He predicted that more than half of the 1-2-3 user base will be running Release 2 by year end.

He also pledged continuing support for the macro language interfaces for 1-2-3 and Symphony and pledged to make "strenuous efforts to preserve standards like file formats and fonts."

Expanded Fortune 2,000 support

Kapor underlined Lotus' intentions to expand support for Fortune 2,000 firms, which he called "trendsetters for the entire user community."

Kapor also reaffirmed, one more time, Lotus' intentions to establish comprehensive corporate user policies in 1986.

While Lotus will be releasing major products this year, he cautioned that many next-generation applications will require a lot more desktop horsepower and graphics-handling horsepower, plus a next-generation version of Microfit Corp.'s MS-DOS that breaks the 640K-byte direct-address barrier.

"But this system software is not presently on the horizon," Kapor said.

Currently, "640K bytes, for cer-

tain efforts, is an absolute barrier," Kapor said. As one example, it precludes significant advance in data base management systems, he said, which is one reason Lotus has not come up with its own data base package and "didn't buy Microrim, Inc."

MS-DOS to leap 640K-byte barrier

Kapor revealed that the Lotus/Intel/Microsoft Expanded Memory Specification, which bypasses the IBM Personal Computer's 640K-byte barrier for data but not for executable code, was designed that way in the expectation that an upgraded MS-DOS would soon leap the barrier.

"We were certain there would be a new operating system, and we didn't want to confuse the marketplace. What did we know?" Kapor said.

Upcoming products from the year-old Engineering and Scientific Prod-

ucts division drew a lot of attention and some requests for Unix versions.

But Lotus is focusing on MS-DOS products for the Personal Computer AT, which has "really caught fire" in this marketplace, according to John Posner, product marketing manager.

"Mountain is coming to Mohammed"

Many Unix-based workstation architectures are acquiring AT-compatible coprocessors, Posner pointed out. "The Unix world is coming to the MS-DOS world; the mountain is coming to Mohammed."

Additionally, instrumentation makers are shifting away from putting intelligence in the data acquisition/analysis system itself. The thought instead is, "Let's decouple the instruments and allow people to use off-the-shelf personal comput-

ers," Posner suggested.

In a different arena, the Information Systems division's new Information Center group is busily overhauling its Ilink micro-to-mainframe data access software.

"We hope to add additional bridges to the mainframe, improve the mainframe software performance, add some features we've been asked for by customers and redo completely the PC software," said group manager Alexander Crosett. Ilink "tends itself to customized applications, and that's the way we're going to have to sell and support it," he noted.

"All of us, as software vendors, are going to be forced into systems selling," Crosett added. "It's a false assumption to come up with a great spreadsheet and assume people will just type data into it."

Choices are you don't currently audit your operating system—even though it's ultimately in control of information used to manage your organization. And for good reason.

For the most part, you don't audit the system because the software is just too complex. Then too, certain hard data on system controls is usually unavailable. And a manual review would take weeks to perform, require outside experts, and cost too much.

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For more information, contact Sharon McLennan today, at 1333 Leveaux Expressway, Santa Clara, CA 95050-3395, (415) 948-4548, Telex 374737. AEX2-Examine/MVS is developed and maintained by SKL, Inc., Rosemont, Illinois. SKL, Inc. is a subsidiary of SKL, Inc., Rosemont, Illinois. SKL, Inc. is a subsidiary of SKL, Inc.

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Spec proposed for graphics interface

From page 33

Other PC industry players present at the unveiling were Ashton-Tate, Lotus Development Corp., Intel Corp., Software Publishing Corp. and board maker Paradise Systems. DeWindt said that others who have endorsed the specification include Teemar, Inc., Microfield Graphics, Hitachi Ltd. and NCR Corp.

According to DeWindt, GSS plans to sell graphics board makers a chip that incorporates the specification. GSS has also placed the specification in the public domain, allowing board makers to encode DGIS into a chip themselves and thereby freeing software developers from copyright concerns.

Boards that use DGIS, she elaborated, would still be able to differ on the type of features they offer, and they could incorporate earlier specifications such as that for IBM's Enhanced Graphics Adapter.

DeWindt also said DGIS is compatible with Microsoft Corp.'s Windows and with software that incorporates several device drivers, such as Lotus' 1-2-3.



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Executive Report

Edited by Janet Fiderio and Becky Batcha



Master programmers

Insights on style from four of the best

By JEFFREY TARTER

In "The Mythical Man-Month," a classic series of essays on the art of software development, author Frederick Brooks compares the master programmer to the anonymous architects who designed the great cathedrals of the Middle Ages. Both the programmer and the medieval architect, Brooks says, impose an integrity of design on a process that is extraordinarily complex, time-consuming and difficult to organize.

It is possible to create adequate software without master programmers, Brooks continues. But, like a cathedral whose original plan has been "improved" by later generations of builders, the finished result often reflects a hodgepodge of styles and con-

flicting ambitions. The master programmer's role is crucial to the creation of great software.

No one agrees exactly who the masters are. Brooks says only that a master is likely to be found leading a small team of programmers. "He needs great talent, 10 years experience and considerable systems and application knowledge," he adds.

In fact, master programmers are a diverse lot. They work on commercial programs and in-house applications; they may tackle small, discrete tasks or manage huge systems that take years to complete. Some consider themselves masters of a traditional craft, while others specialize in more esoteric technologies. Some even see programming as a minor part of their jobs, preferring to make other creative and managerial contributions.

To shed some light on the character of the master programmer and the environment in which he thrives, *Computerworld* recently interviewed four veteran program

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Managing for productivity: An interview with The Hartford Insurance Group's Bernard A. Renois/47

Skill development, meaningful work — elements in successful programming shops/48

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Computer software is an art. If you want to get the work done right, you have to treat good programmers like artists.

Tarter is editor and publisher of "Softletter," a biweekly newsletter that reports on trends in the microcomputer software industry. He works out of Cambridge, Mass.

Insights from four of the best

Continued from previous page
 developers who, in the opinion of their peers, rank among the profession's best and most talented practitioners.

The problem solver: David Achmann

At Monsanto Co. headquarters in St. Louis, David Achmann holds a reputation as something of a whiz at mainframe graphics programming. One of his recent successes, the creation of a tricky print spooler utility for pen plotters, indicates the reputation is well deserved. The project involved creating new device drivers and a job control language, among other tasks.

But writing the print spooler was no big deal, according to Achmann, a senior computer consultant at the firm. His real accomplishment came in recognizing that Monsanto needed a print spooler in the first place.

Before Achmann's program was available, Monsanto's graphics workstations were limited to one task at a time: either creating graphics or driving a pen plotter — a terribly slow process. "I'd see people hanging around their plotters, trying to kill time while they were waiting for their hard-copy output," Achmann says. "They took for granted that the machines had to work that way."

He felt otherwise. "I'm convinced that any time people have to wait to do something, there's a problem that could be solved," he says. "And there was." Now that the utility he created is working, users can queue up their plotter jobs and start immediately on fresh design projects.

After 14 years as a programmer for large corporations, Achmann, 37, sees problem solving of this kind as an increasingly critical part of his job.

He still writes programs — in fact, he estimates that he has produced more than 150,000 lines of code in the last six years. But he points out that the availability of good commercial software dramatically changed the role of programmers in corporate data processing departments.

"In 1970, when I was first hired on at Monsanto, I spent most of my time writing code. Now, we buy our major systems, and I work a lot more on writing little utilities and modules that make the packages we buy more useful."

As a result of this change, Achmann now works more closely with end users, helping them analyze their data processing needs and training them to use existing systems more productively. More and more, he relies on communications skills, and he considers these skills essential for anyone who expects to succeed as a programmer.

"I train Boy Scouts for their computer sciences merit badges," he says. "If they're interested in programming as a career, it shocks them a little when I tell them it's more important to do well in English classes than to take a lot of math courses."

Programmers who do not know how to communicate well with users, Achmann

adds, can easily miss some of the more subtle messages that they should be hearing. "It isn't easy to just walk into somebody's office and define his problem," he says. "You sometimes have to pay attention to what isn't being said."

"And you usually have to sell the user on the idea that your solution is the right way to do it. Not much gets done in an us vs. them situation," he says.

To succeed at problem solving, Achmann feels, a master programmer needs broad experience, not just in-depth knowledge of one or two programming specialties. His own career certainly fits the bill.

He trained as a mechanical engineer but talked his way into a programming job at McDonnell Douglas Corp. in 1972. He worked on time-sharing projects and took advanced computer courses to fill in the gaps in his programming skills.

Since then, he has worked on systems programming, internal applications development, computer-aided instruction and a commercial data base management package and laser printer graphics. Right now, he spends some time evaluating expert systems and mainframe technology for Monsanto.

But experience and problem-solving talents go now here, Achmann says, without a final ingredient: the right kind of management support. He walked out of an earlier job because of "petty politics and bosses who failed to deliver on their promises too many times."

He suspects, moreover, that many programming fiascos occur when middle managers cave in to pressures from above rather than defend the judgment of their programming professionals.

Unfortunately, he says, good managers are often hard to find. Many of the people who supervise programmers are technicians who have been knighted for superior performance. These people know all about programming, but they know little about creating the right chemistry among individuals on a team.

"I've done some people management myself," Achmann says, "so I know how hard it is. I was in charge of 12 people for a while year, and I thought I was supposed to be the expert who was going to show them all how to code." He laughs ruefully. "The job almost killed me."

The trail blazer: Jeff Gibbons

Any day now, Jeff Gibbons, a 34-year-old vice-president of technology at Palladian Software Corp. in Cambridge, Mass., will visit a customer site and help install the first production version of his company's new expert system product. When that happens, Gibbons promises he'll finally take a few days off, "to catch up on my sleep, do some laundry and file my income taxes."

In partnership with Alice Hartley, who shares the vice-president of technology title at Palladian, Gibbons just completed 16 grueling months on the expert system, known as

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Expert's Opinion

Strategies of the Superstars

By JON BENTLEY

Superprogrammers are born, not made. They're just plain smarter than the rest of us. Even so, they have their tricks (learned, no doubt, by rote in superprogrammer kindergarten):

1. Solve the right problem.
2. Keep it simple.
3. Use the right tools.

The creative application of these tricks just might help a fair programmer become pretty good. So pay attention: The story that follows — a true story — illustrates all three.

In a long project that started in 1981, engineers at Lockheed Corp. set out to find a way to transmit about a dozen drawings a day from a computer-aided design system in their Burbank, Calif., plant to a test station in Westborough, Mass., Calif.

The two facilities lay just 25 miles apart, but Lockheed's automobile courier spent more than an hour getting from one to the other, mainly because of traffic jams and mountain roads. The trips cost approximately a hundred dollars a day.

Fortunately, microwave connections linked computers at the two facilities. Given enough development time and money, any good programmer could build a system to transmit the pictures over that link.

Lockheed looked beyond this obvious approach, though, and devised a superplotter. Engineers at the main plant drew the pictures, photographed them and sent the film by carrier pigeon to the test station, where technicians enlarged and printed it. The pigeon's flight took half the time of the car's journey and cost only a few dollars per day (literally, pigeon feed).

Solve the right problem. Most programmers hear about a problem then rush off to solve it. Superprogrammers take the time to identify the right problem.

Someone at Lockheed had the good sense to realize that the company's problem was not a lack of software for transmitting graphics but rather an inability to transport high-quality pictures quickly and cheaply.

Users often don't know what they really want. A superprogrammer takes the time to find out. Above all, he listens to the users.

Keep it simple. Good programmers rush to write a 4,000-line program in just a month. Superprogrammers solve the same problem by thinking hard for a week and then writing a few hundred lines, if any.

Carrier pigeons required no coding and provided Lockheed with an elegant solution to a difficult problem.

The simplest solutions are usually the best: They are easy to build and contain few parts that can break down.

Use the right tool. Of course, the very simplest program is no program at all. Superprogrammers never write a new program if they can get by with existing tools.

Lockheed's engineers investigated several tools, including card and computer, before settling on carrier pigeons. Superprogrammers carry around a large tool box and select the right tool for the job at hand. When they cannot find an appropriate tool, they build one and then implement it as simply as possible.

How can a manager get hold of some superprogrammers? The easiest way is to hire them off the street.

They're scarce, though, and a data processing shop will probably need to raise its own. A manager can help his good programmers become super by encouraging their professional development through classes and reading.

How can a manager hold on to the superprogrammers he has? Give them the managerial support their methods require: Let them solve the right problem; reward simplicity; encourage tool building. Above all, make the job fun. Superprogrammers stay super only because they love what they do.

Bentley works in the Computing Science Research Center at AT&T Bell Laboratories. He writes a column called "Programming Pearls" in Communications of the ACM Journal and recently published a book by the same name (Addison-Wesley Publishing Co., 1985).



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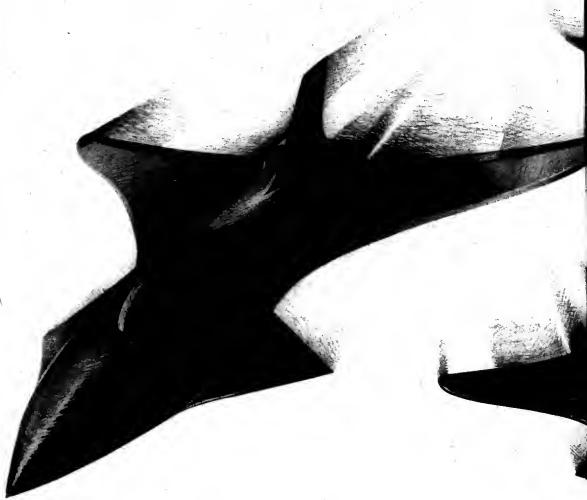


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Executive Report Master Programmers

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the Corporate Financial Advisor. Developing the program put a heavy burden on Gibbons and Hartley — the project's two lead programmers — as well as the rest of Palladian's technical staff. To achieve the combination of power and friendliness the product required, Gibbons, Hartley and other Palladian programmers wrote more than a half million lines of code.

According to Gibbons, the trouble paid off. The completed program draws on sophisticated artificial intelligence technology and can analyze complex financial problems. But its operation is so intuitive to users, he says, that the program will come without an instruction manual.

Gibbons himself is largely responsible for the program's user inter-

face, but he also dealt with a heavy work load of training, troubleshooting and design tasks. "I tend to get involved in just about every aspect of the system — from generating ideas to writing low-level code — so the ideas come out the way I want," he says.

As a result, he typically spends 16 hours a day at Palladian's offices, with rarely a day off. "My friends think I'm crazy," he admits.

Even Palladian's top management sometimes worries about the pressure. After one unusually intense period of work, the company's chairman and president declared Palladian's offices off-limits for the weekend and handed out \$50 bills with a request that employees take a break.

But Gibbons feels no regret about

what he does. In fact, he does exactly what he likes best — working on the leading edge of programming technology, helping transform theoretical concepts into a real-life product. "We're all working this hard because we're creating something new and important," he says.

Gibbons has always been fascinated by the outer limits of computer technology. In college in the early 1970s, when programming still relied on stacks of punch cards, he fell in love with the esoteric issues raised by "the cognitive side of artificial intelligence."

He pursued a degree in engineering and computer sciences but studied linguistics and philosophy as well, "searching for the Holy Grail of cognition." After school, he moved on to research work at Bolt Beranek

& Newman, Inc. (BB&N), a Cambridge, Mass., high-tech think tank.

At BB&N, Gibbons spent six years restlessly exploring the outer edges of computer technology. He worked on LISP, one of the major programming languages for artificial intelligence applications, and helped design an AI workstation. Eventually, he began to specialize in smart interfaces — bit-mapped screens, windowing and a variety of techniques that help users interact with computers.

But he became progressively more disenchanted with his work at BB&N, particularly because of the "pains of dealing with government funding." So he hardly hesitated when a former BB&N colleague offered him a job at Palladian, a well-funded, well-connected start-up with ambitious plans.

"When Palladian came along, I knew instantly it was the opportunity I'd been waiting for," Gibbons recalls. "They were going to develop a real product, not just do research

"We increased productivity 35% on our first project with Excelerator..."



"This is what I've always wanted to do. Maybe next time, though, I'll figure out how to get some sleep and have a personal life, too."

— Jeff Gibbons
Palladian Software, Inc.

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— and I'm the kind of person who gets frustrated when I can't see tangible results."

Palladian also gave him a chance to blend leading-edge technologies with some fairly traditional programming techniques. "This is a hybrid system," he explains. "Where it makes sense to use AI, I'll use it. Where it's brute force performance we need, I'll use traditional programming."

In fact, he adds, much of what attracted him to the Palladian expert system work was the freedom of experimentation the project allowed him. If a solution looked promising, Gibbons could simply start writing code.

He also found himself dealing with a good many conventional problems, such as debugging the system and trying to optimize performance. But even in these familiar environs, the complexity of the program offered a share of surprises. "What you think about performance bottlenecks on a project like this often turns out to be completely wrong."

Moreover, the program forced

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Executive Report Master Programmers

Program for success: Management tips from a top shop

The Hartford Insurance Group has a reputation as being one of the top programming shops in the East Coast. The company employs nearly 2,200 people in its Information Management group. About 1,800 analysts and programmers are located in its systems division alone.

Computerworld senior editor, Janet McGinnis, recently interviewed The Hartford's Bernard A. Benoit, the Secretary and Deputy Director of Information Management Systems, to uncover the company's management philosophy. Benoit is responsible for between 400 and 200 systems analysts and programmers — professionals who provide The Hartford with its applications software.

Are all of your programmer/analysts actively involved in coding?
I would say 99.9% have coded at some time or another. Since this is a large shop, we have to have some flexibility concerning moving people from one job to another; in fact, we encourage it very much.

In career planning part of your management style at The Hartford?
We do a great deal of career path planning. We want our employees to consider what it is they want to do because there are several different career paths that they can take here. A programmer can follow a technical or an analytical route, or he or she can switch over to a project management or a management role.

The typical starting point for employees in this department is as an entry-level programmer. Once the employee has a couple years of programming experience, a decision point comes, and he must decide if it is management, project management, analysis or high-tech-type programming that interests him.

What is your person-to-person program all about?

Person to person is a program that requires our managers or supervisors to interview each of their employees four times a year. The interviews are not an appraisal or a performance review but a career planning and how-are-we-getting-along interview.

It is a formal program where each employee is required to do homework so that he knows what he is wants to discuss during the interview. We stress to our employees that the purpose of the interviews is to talk about what they want to do and learn how everything is working out.

What type of follow-up is required of managers after a person-to-person interview?

If an interview shows that a programmer is leaning toward, let's say, management, then that programmer's supervisor will make sure that the employee gets the kind of job and education that will lead him in that direction.

The program is not only good for the employee, but it serves as an excellent vehicle for ensuring that we spend money on education in the right places, which is a very difficult task. We spend a lot of money on education, so there is always a fear that we're mispending it as wisely as we could. It is important that we give the right person the right education at the right time.

Is training considered a benefit at The Hartford?

Training is a requirement of the job. We don't go quite as far as saying you can't get promoted without having education, but clearly that's a contributing factor.

We have a very broad education program for all levels, including management. We run what's effectively a small college. Our people. Since The Hartford brings in many entry-level people from the outside, we really train them on how to be programmers.

Do your programmer/analysts view education as a means of keeping up on current technology?
Absolutely. I don't think a com-

puter person can't find the job he or she wants here and has to go somewhere else, then. The Hartford management team's job is to get that person very much. Clearly there is a job for that person at The Hartford.

When we first started open posting years and years ago, some supervisors really looked down on those who wanted to transfer. A person who wanted a transfer, many times, would eventually wind up leaving the company.

Now, we want to prevent that from happening. If someone is uncomfortable where he is we can find him another job.

How do you encourage initiative in your programmer/analysts?
We do encourage them to take steps in their work.

We have several programs in place that do that, but most important is our emphasis on good management. As for other incentive programs, there is the reasonable-code program, which encourages our people to add to our reasonable-code library, not to create code from scratch. We have a similar program which encourages our employees to

we've had it for a number of years. There are cut hours that we've cut everyone to work — 9:30 to 5:00 — and then from that, you can start at 7:00 and leave at 2:30 or you can start at 9:30 and leave at 5:00. The supervisor makes sure that that's reasonably being maintained. And that is not because management is afraid that you're not going to [put in] your hours. I personally think that you get more, I really do.

How are programmers handled for your programmer/analysts?

Our compensation policy is quite flexible, and it's based on pay for performance. We set objectives at the beginning of an employee's tenure, and we measure against those objectives.

Professional opportunities, especially lateral opportunities, are geared low and that's not someone who is performing in a superior manner can move faster than someone who performs a fine job which is not superior.

What is the typical career path for extremely bright programmer/analysts at The Hartford?

It depends on what they want to do; clearly, we want to keep them challenged. When an employee comes along that wants to be the slickest, best programmer ever, we channel him into these kinds of positions that are almost at the top of his career path. We may, for instance, move that person to a more technical application. Eventually, the person may wind up working in our technical group supporting the systems code that runs the operating system.

That is one path. Another, if the employee is interested in exotic data base design and coding, would be to have the person work in the DBMS unit.

On in your own artificial intelligence group?

Yes, once it gets started. That's a good point. We have people that are really interested in AI who have approached us about working on AI projects. What we do in this situation is to give them the opportunity to apply for any opening that comes up in the AI group.

The same thing happens with the programmer/analyst who wants to get into management. We advise them to hone their skills in the analytical world, become a project leader and ease their way into management that way. Sometimes, they find that it isn't management but project leading or design that is their interest. After all, we have very good and creative people that really want to do sophisticated design work and don't want to be bothered with human resources. We want to make sure we get the right person in the right slot.

One of the things I think is overlooked sometimes in companies is that we should be challenging people more and more. I don't think that's anything worse than coming to work and being bored.

99

One of the points overlooked sometimes in companies is that we should be challenging people more and more.

ny could survive in this business if it didn't provide sound educational programs. If it didn't, it would need two things: Its people aren't reaching out, and its systems are dying.

If The Hartford doesn't provide training, it is demanded by our employees in their person-to-person interviews. There's no question about it, and that comes out very loud and clear. We get a lot of suggestions for different kinds of courses that we should be teaching right from the students.

If companies don't look at the new way of doing things, they will fall behind. What concerns me a little is that new ways are coming at us faster and faster and faster.

What do you do to keep on top of changes?

There are a lot of ways to skin a cat these days. One of the jobs of our support unit is to determine what the new developments or new techniques are that The Hartford should adopt.

How do you encourage your employees to stay with The Hartford?

We have an open posting program, and we are not bushing about it; in fact, we encourage it. If an

employee can't find the job he or she wants here and has to go somewhere else, then.

In addition, we have special salary incentives where we can give cash awards to employees for doing excellent jobs. I'm not talking about performance ratings here. The type of award could go to an average performer that had a spark of doing something exceptionally well that management wants to reward him for. In addition, we have other similar kinds of incentive programs.

We also have work groups where people discuss new and different ideas — how to do things better or easier — system analysis round tables. Technical coordinator group meetings are also scheduled.

Are your programmer/analysts encouraged to move from one product to another or to try different applications areas?

We do encourage it, but you can't have someone moving all the time. So the only thing we require is that a staff member be in a position a year. And once he is in a year, and another opening is posted for which he is qualified, then feel free.

Do you offer bonuses?
Yes, we have five hours, and

Managing to keep the programming, DP staff productive

By **DAVID KELLEHER**

Managing programmers and data processing personnel is a multifaceted task. Both managers and consultants stress that there are a variety of methods management can use to encourage productivity, continued professional growth and high morale among DP employees. According to David Adler, director of information systems at American

Transtech, Inc., AT&T's data services subsidiary in Jacksonville, Fla., lack of connection between job and end product can contribute to poor morale among programmers and other data processing staff members and should be avoided.

"These people are constantly asked to perform tasks without knowing why or ever being able to see the end result," he says. Automotive assembly work may be boring and repetitive, Adler says, but at least autoworkers have something that they can point to as the product of their labor. Data processing personnel seldom have that satisfaction. That used to be the situation at

American Transtech, but in the beginning of 1985, the company drastically reorganized the structure of its data processing organization. Instead of performing a single technical job for a spectrum of products and end users, data processing personnel and programmers now work in teams assigned to specific products and groups of users and follow the process from beginning to end.

The reorganization has not been totally painless, Adler says. Not everyone responds well to the idea of teamwork, especially if a person has been used to running his own small show. Then, too, there is a learning curve that must be scaled.

Once accomplished, though, this kind of restructuring does pay off. In fact, Adler says, the only logical reason for instituting an effort of this kind is a belief that by changing the structure of work and expanding responsibilities, management will enhance productivity.

Staff members at American Transtech are more satisfied, Adler says, because they know that they are valuable and that they can contribute to results like the substantial reduction in production costs that the company has realized through team suggestions.

American Transtech's experience bears out the philosophy of Robert Zowaki, partner in Couger/Zowaki Associates, a consulting firm in Colorado Springs that specializes in data processing management. According to Zowaki, the long-standing question used in data processing management — happy programmers equal productive programmers — really should be reversed. It is more relevant and useful, he explains, to say that productive programmers are satisfied programmers.

"The thing that data processing personnel want most," Zowaki says, "is meaningful work. It is when they don't have meaningful work that they are most apt to quit."

The problem, however, is more far-reaching than what can be detected from turnover rates. High as they are throughout the industry, these figures represent only part of the problem, according to Zowaki.

"A lot of people stay in their jobs, even though they don't find them challenging," he says. "The way they cope is to adjust their productivity downward."

Zowaki and his partner, Daniel Couger, who are also professors of management and computer science at the University of Colorado, identify five elements that are necessary to make work truly meaningful for data processing personnel:

- The work presents opportunities for the employee to exercise a variety of skills.

- The professional performing the work identifies with the overall system and the users of the system to which he is contributing.

- The worker perceives the task as having some importance.

- The employee operates with a degree of autonomy or latitude within set goals and deadlines.

- The employee receives feedback on the project, both from the work itself and from managers.

The real world does not always allow for an ideal mixture of all these elements, so it is sometimes necessary for companies to compensate for deficiencies in the job itself, with extra efforts in other areas.

Skill development, for example, is a high priority for DP personnel, he says. According to Zowaki, the strongest growth needs of any employee group ever measured.

In fact, says Shaku Attar, president of Atr International Consultants, Inc. in Rye, N.Y., keeping programmers up with the state of the art is the major key to keeping them satisfied and rooted.

Kelleher is a Boston-based freelance writer who specializes in high technology issues.

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UNIX Internals	Feb 24-26 Feb 27-29 Mar 1-3 Mar 4-6 Mar 7-9	Mar 21-23 Jul 11-13 Sep 18-20	Mar 14-16 Jul 11-13 Oct 21-23	Jan 28-30 Apr 25-27 Oct 21-23	Mar 14-16 Jul 11-13 Oct 21-23	Jan 28-30 Apr 25-27 Oct 21-23	Jan 28-30 Apr 25-27 Oct 21-23	Jan 28-30 Apr 25-27 Oct 21-23	Jan 28-30 Apr 25-27 Oct 21-23
UNIX Administration*	Feb 24-26 Feb 27-29 Mar 1-3 Mar 4-6 Mar 7-9	Mar 21-23 Jul 11-13 Sep 18-20	Mar 14-16 Jul 11-13 Oct 21-23	Jan 28-30 Apr 25-27 Oct 21-23	Mar 14-16 Jul 11-13 Oct 21-23	Jan 28-30 Apr 25-27 Oct 21-23	Jan 28-30 Apr 25-27 Oct 21-23	Jan 28-30 Apr 25-27 Oct 21-23	Jan 28-30 Apr 25-27 Oct 21-23
Advanced C Programming Workshop	Mar 3-5 Mar 6-8 Mar 9-11 Mar 12-14 Mar 15-17	Mar 21-23 Jul 11-13 Sep 18-20	Mar 14-16 Jul 11-13 Oct 21-23	Jan 28-30 Apr 25-27 Oct 21-23	Mar 14-16 Jul 11-13 Oct 21-23	Jan 28-30 Apr 25-27 Oct 21-23	Jan 28-30 Apr 25-27 Oct 21-23	Jan 28-30 Apr 25-27 Oct 21-23	Jan 28-30 Apr 25-27 Oct 21-23
Advanced C Programming Workshop	Mar 3-5 Mar 6-8 Mar 9-11 Mar 12-14 Mar 15-17	Mar 21-23 Jul 11-13 Sep 18-20	Mar 14-16 Jul 11-13 Oct 21-23	Jan 28-30 Apr 25-27 Oct 21-23	Mar 14-16 Jul 11-13 Oct 21-23	Jan 28-30 Apr 25-27 Oct 21-23	Jan 28-30 Apr 25-27 Oct 21-23	Jan 28-30 Apr 25-27 Oct 21-23	Jan 28-30 Apr 25-27 Oct 21-23
Workshop: Shell & Shell*	Feb 24-26 Feb 27-29 Mar 1-3 Mar 4-6 Mar 7-9	Mar 21-23 Jul 11-13 Sep 18-20	Mar 14-16 Jul 11-13 Oct 21-23	Jan 28-30 Apr 25-27 Oct 21-23	Mar 14-16 Jul 11-13 Oct 21-23	Jan 28-30 Apr 25-27 Oct 21-23	Jan 28-30 Apr 25-27 Oct 21-23	Jan 28-30 Apr 25-27 Oct 21-23	Jan 28-30 Apr 25-27 Oct 21-23

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"It is important to realize," she says, "that the loyalty of data processing professionals isn't to the company but to what they know and how marketable they are."

Another key determinant of staff satisfaction and performance is the amount and quality of feedback that DP personnel receive from managers.

"There isn't any magic figure that is the exactly right amount of contact between managers and employees," says Ned Chapin, data processing consultant with Infocore, Inc. in Menlo Park, Calif., "but what we do know is that, when it comes to data processing, the time spent falls far short of what it should be... I'd say by about a factor of two."

What contact there is, Chapin adds, is too often confined to the assignment or changing of projects. "Those couple of minutes a week just isn't enough," he says. Neither is the quality of the give-and-take discussion in many cases.

Among the prime management frustrations for programmers, according to consultants, are decisions that are frequently seen as arbitrary or contradictory and the sense that their needs and concerns are not really being heard.

One means of addressing this problem is through the incorporation of communication skills development into training for technical managers. Another approach, one used at Coca-Cola Co., is to draw technical managers more closely into the mainstream of the organization, training them in the same classes as managers from other parts of the organization and encouraging their inclusion in meetings outside the information systems area.

"Data processing is unique in some ways," says Sharon Gance, group manager in production systems support at Coca-Cola, "but it also has a lot in common with other service organizations within the company."

Managers who have been exposed to the goals, priorities and needs in other parts of the organization can, she says, help the programmers in their departments to understand how their work fits in with the company as a whole.

Florida Power & Light Co. in Miami has taken the concepts of enhanced communication and cross-pollination one step further. After a seminar by Couger/Zowaki two years ago, says Don Borgschulte, director of systems and programming, the MIS department decided to try team brainstorming as a means of isolating factors that might be encumbering its efficiency.

Five significant problems surfaced during that first effort, he says, including an imbalance between the department's recruitment policy and its staffing needs as perceived by existing employees.

"Our data processing professionals felt strongly that we were suffering from a chronic lack of experienced staff personnel," Borgschulte says, "and yet we had been committed for five years to a hiring policy that concentrated on the acquisition of entry-level computer science grads."

Over the past two years, the concept of quality improvement teams has expanded to the point where fully 70% of the personnel in MIS are volunteer participants in one or another of the department's 17 such

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'The loyalty of data processing professionals isn't to the company but to what they know and how marketable they are.'

—Shelby Atré
Atré International Consultants, Inc.

groups. Not only have these teams improved productivity, Borgschulte says, but they have also contributed in large degree to a decline in turnover rate of between 10% and 15% and produced a significant improvement in communication.

First-line supervisors, who are automatically delegated team leaders, are interacting more with data processing personnel and in a con-

text that promotes free exchange. Some teams have also been formed that include personnel from both data processing and other departments, which has, he says, "helped to eliminate a lot of long-standing barriers and to enrich some people's understanding."

Then too, since it is policy that each team must make a yearly presentation of its work and findings to

a lead team made up of all the department's application managers — and that every member must participate in the presentation — any programmer who makes the effort to get involved can count on having at least those opportunities for having his views heard and his work credited by higher management.

That last is no small point. The need for recognition is very strong in data processing personnel, Atré says. It is certainly stronger than their concern for money, which is mostly of interest only to the extent of ensuring they are being paid fairly in comparison with their peers. If these people are greedy for anything, she says, it is acknowledgment — "not just a private pat on the back but public recognition before their colleagues."



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Executive Report *Master Programmers*

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Gibbons to sharpen his judgment about how to make the right trade-offs in machine and human resources, features and scheduling. Ultimately, these judgments rest on a programmer's experience, he insists. Technology contributes almost nothing to getting the right balance.

Now that the Financial Advisor is finally finished, Gibbons and his co-workers have solved the really tough problems. What remains, he says, are enhancements and maintenance programming — not the kind of tasks that compare with the challenges of developing what he calls a bleeding-edge program.

But he does not expect to get restless at Palladian. Other projects await, and Gibbons is already beginning to think about redesigning the

Financial Advisor's entire internal system "so that it won't be as hard to build other products."

"This is what I've always wanted to do," he says. "Maybe next time, though, I'll figure out how to get some sleep and have a personal life, too."

□ □

The project manager: Jim Miller

Jim Miller finds it easy to spot a master programmer. "The really good people have a kind of instinct. Give them two days with a project, and they'll always spot something critical nobody else saw. And they'll be right."

Miller, 38, is a veteran programmer with one of the rarest of all instincts: He knows how to manage people. As coleader on a major programming project at Arthur Andersen & Co.'s Chicago office, Miller is responsible for a team of 13 programmers — most fresh off the college campus.

Miller's project involves the development of various software tools that consultants from Arthur Andersen use to help analyze their clients' automation needs and build appropriate computer systems. It is extraordinarily complex, with "735 reasonably small Basic programs, 50 medium-size PC assembler programs and five mainframe Cobol programs," Miller says. "And there is plenty more to do."

The project is so wide-ranging

that Arthur Andersen's top management initially viewed it as an R&D effort. "At the beginning," Miller says, "we were given a rather long rope." But Miller's team consistently met development schedules and sometimes delivered more than it promised, and the project gained legitimacy as a solid business effort. "Now," he says, "we have a lot of credibility."

Miller, who joined Arthur Andersen straight out of college himself in 1971, has managed this project for three years. At first glance, he hardly seems to take his management role seriously, at least by conventional standards. He spends at least a third of his time writing code; occasionally, he takes a walk around the big room where team members work, listening to conversations and asking a few questions.

His programmers are free to set their own hours, nobody bothers to keep track of how many lines of code they write, and Miller requires the bare minimum of paperwork and formal meetings. "However, we do all wear ties and dark suits, like everybody else at Arthur Andersen," he quips.

The typical computer system forces programmers to spend so much time maintaining existing programs that new ones (and the people who need the information) just have to wait. Sometimes as long as a year.

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Miller has also dispensed with formal organization among team members. Usually, programmers work in groups of three, led by whoever happens to be most experienced and knowledgeable about a particular phase of the project. "If you asked who works for whom, you'd probably get 13 different answers," Miller says. "The organization really depends on what we're working on at the time."

Of course, some controls remain. Project members must document what they do, "so individuals don't lose a week of their time because somebody else made an unannounced change." And the team uses a fairly formal procedure for deciding what goes into each release. "We have a list of features arranged in terms of relative importance. We draw a line on that list, and that's the minimum that has to be done."

But Miller concedes that even the

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 formal procedures are not all that strict. "One of the programmers here had an idea for improving the program's memory management, which wasn't very high on anybody's list of things we needed to do. He'd been itching to work on it for a year, and finally over Christmas, I set him loose. He whipped through it in about four days."

Miller's unorthodox management style gets results. Without appearing to take his job seriously, he nevertheless succeeds in leading and inspiring his team members — some of whom are so skillful Miller "wouldn't want to get into a programming contest with them."

One of his secrets, he says, is a belief that the best way to motivate people is to give them an opportunity to learn new skills. To keep his programmers constantly challenged, Miller reshuffles assignments on a regular basis.

"If an individual is tired of working with Basic and wants to learn assembler, that's fine with me. In theory, there's a new learning curve that starts. But it's not inefficient at all. The payback is enormous."

In fact, Miller says he believes that too much stability destroys productivity and fresh thinking. "People do their best work when they have a major upheaval in their lives every three years or so."

"Of course, the major systems and software vendors do a pretty good job of making sure that happens to programmers anyway."

On a smaller scale, he says, the pressure of deadlines seems to serve the same purpose.

"Whenever we come to a scheduled release date, I notice the pace here speeds up. There's a sense of pride — people not only want to meet the minimums, they also want to get more into the program," Miller says.

Miller notes that his methods work well in large part because Arthur Andersen itself is a growing, upwardly mobile firm that rewards people who achieve notable successes.

But he has some mixed feelings about following a career path that leads him toward management on a larger scale and away from the intimacy and technical challenges of running a small project.

"We have people in our organization who are pretty good at running projects with 90 people. How do they do it? I don't want to find out."

The entrepreneur: Dan Bricklin

Dan Bricklin, the 35-year-old inventor of Visicalc, has achieved something close to celebrity status in the programming community, and he freely admits to seeking the limelight.

One major reason he left a corporate programming job

to become a software entrepreneur, he says, is that too many good programmers in large companies end up in obscurity.

He first realized that programming could be "a pretty dead-end job" back in the late 1970s, when he was working for Digital Equipment Corp. on word processing and electronic typesetting systems.

"I'd see talented programmers in their 50s who



couldn't get hired, while the young whippersnappers straight out of school were getting all the good offers," he says. "It dawned on me that we were working hard to put ourselves out of work."

He also began to have other reservations about programming as a career. Programming was "sheer fun" for Bricklin, who had worked with computers ever since his high school days.

But, while working at DEC, he began to realize that "being a programmer and having a reasonable family life somehow don't go together."

The often-erratic hours presented one problem. "At Digital, I used to program at night, when it was quiet. You need the long stretches. Some things just take 18-hour periods to finish."

What finally tipped the scales, however, was DEC's

decision to transfer Bricklin's whole division from Massachusetts to New Hampshire.

Faced with the choice of uprooting his family or spending several hours a day commuting, Bricklin decided that the time had come to change the direction of his career.

What he especially needed, he realized after talking

to some executive recruiters, were the skills and contacts that help make entrepreneurs successful. In 1978, Bricklin signed up for a two-year MBA program at Harvard Business School.

There, watching students laboriously copy and erase columns of numbers on sheets of green ledger paper, he had a flash of inspiration. "I thought, wouldn't it be nice if we had an electronic blackboard?"

Bricklin shelved out what he thought the human interface for his "visible calculator" should look like.

"Then," he says, "I tried to figure out how to make it work." He says he almost always starts a programming project by creating a prototype, and the first draft of VisiCalc was no exception.

He feels so strongly about the usefulness of this methodology, in fact, that he is willing to bank on it. His latest software creation, Dan Bricklin's Demo Program, is a micro-based prototyping tool.

Bricklin promotes the product single-handedly—answering telephone inquiries, typing invoices and filling orders from a cluttered spare bedroom in his home in West Newton, Mass. "Right now, the company is just me," he says, "and that's the way I like it."

He admits there are times when he misses working closely with other programmers. "But I happen to like creating small, very personal tools," he says. "And I've noticed that a lot of the biggest hits in personal computer software have been put together by one person."

Working alone, Bricklin estimates that he can turn out at least one new PC product a year. The Demo Program consists of approximately 17,000 lines of code; it took him a little more than six months to write. "I type fast," Bricklin says with a grin.

He typically begins a development project by making rough notes on paper but quickly moves to a computer, where he creates a mock-up of the software's main screen and writes enough code to show that essential data structures work properly.

"What the prototype should let you do," he explains, "is get across the core idea that distinguishes the product. The key to this process is usually only about one page of code."

To Bricklin, a carefully conceived interface is one of the most crucial features of a prototype and one of the best tests of a master programmer's skills.

By this yardstick, he has achieved a remarkably durable success. Hundreds of microcomputer software developers have copied the screen layout and commands he developed for VisiCalc; the original program, in fact, has become a de facto programming language.

But he insists that a prototype needs to do more than demonstrate the human interface. Performance is as important as ease of use, he says, and the prototype stage is the place to work out

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MS-DOS creator Tim Paterson earns place in industry annals

By PEGGY WATT

Tim Paterson might be the guy you've been griping about. He's the anonymous one you've growled at when an unexpected "A" prompt appears or when a microcomputer's memory just isn't what you wish it

could be.

But look at it this way: If it weren't for him, you could be dealing with CP/M.

Hindsight is 20-20, of course, but Paterson admits he would do a few things differently if he had known five years ago that the "Quick-and-Dirty Operating System" (internally known

appropriately as QDOS) he was piecing together would be the foundation for millions of microcomputers today.

The project became, of course, MS-DOS, which Paterson, as an employee of Seattle Computer Products, Inc., wrote in 1980 on a contract for Microsoft Corp.,

which had a job with an unnamed "major OEM."

"The thing was they needed to get something really quick," Paterson recalls. "I figured later I'd go back and work out the finished operating system with multitasking and all that."

As to eventual memory limitations, well, "in 1980,

who would've thought that 64 megabytes was going to be considered not big enough?"

And, admittedly, the so-called 96 DOS he churned out in just two months is the ancestor of the MS-DOS or PC-DOS in use today. Both Microsoft's and IBM's own programmers had a hand in developing the version eventually released with the IBM Personal Computer in August 1981, as well as in spearheading subsequent revisions of the product.

Paterson wrote DOS in 8080 assembly language on a Zilog, Inc. 280 machine and translated it to the 8086 system. Microsoft paid \$50,000 for it in 1981, though the amount was not disclosed.

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'I made my one contribution. I feel like I had an effect on history. If I hadn't been there to write it, I guess it would've been CP/M 86.'

— Tim Paterson
MS-DOS creator

until recently, when Seattle Computer Products filed a \$50 million suit that also seeks return of the rights to DOS.

Seattle Computer filed suit in King County Superior Court shortly before Microsoft's public stock offering last month asking either damages of \$40 million or the return of all rights to DOS — along with past and future DOS revenues (CW, Feb. 10).

Last year alone, Microsoft's systems software sales (including MS-DOS) were \$75 million, just over half of the company's total revenue. The company vowed to fight the suit.

Paterson's work with 96 DOS ended in July 1981, and he went back to working on 8086-based microcomputers for Seattle Computer.

His work has been hardware-oriented since then. Even when he worked for Microsoft for about a year in 1981 and 1982, he spent only a brief time on the DOS group, preferring to write assembly code and work in its basic compiler group.

In 1983, Paterson founded Falcon Technology, Inc. in Kent, Wash., and is now vice-president of engineering.

Falcon produces three
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Watt is a Computerworld West Coast correspondent.

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Executive Report Master Programmers

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critical performance standards.

He relies on his own quick check for performance: He handwrites a few hundred lines of code for key algorithms, then counts the number of instruction cycles to determine whether the program will run fast enough.

"You have to design performance in from the first," he insists. "You can't just hope you'll be able to speed things up later."

Speed, however, is only one of the attributes that contribute to high performance. "The meaning of performance always varies from program to program," Bricklin explains, depending on the application at hand.

For an office application like spreadsheets, for instance, eliminat-

ing unnecessary keystrokes is as important as providing speedy calculations.

Least a programmer overlook such variables, he should strive to come up with a clear wish list of performance standards, Bricklin says. "If you really want the job to come out right, you spend the time at the beginning figuring out how to do it. There are no shortcuts."

Determining performance standards and making sure that someone takes responsibility for meeting each one is especially crucial when a project involves more than one programmer.

Otherwise, Bricklin says, every programmer assumes that someone else is taking care of performance,

and no one ends up getting the job done.

"It's not enough just to have a team that's worked well together before," he explains. "If you take a good football team and put them on a basketball court, they're not going to score well until you show them how the game is played."

But ultimately, success in any programming project depends almost entirely on the talents and vision of individual programmers.

"You can't just take an OK programmer and have a good manager or a good team help him do the things he doesn't understand or have a feel for," Bricklin insists.

"Computer software is an art, and if you want to get the work done right, you have to treat good programmers like artists."

Continued from page 84

types of hard-disk controllers and does contract work and consulting as well.

Its primary product, the PC Extender, was released in December 1983. The add-on board features hard-disk controller and serial port clock/calendar to upgrade an IBM Personal Computer to the level of a Personal Computer XT, "only faster," Paterson says.

Falcon also produces the FXT floppy- and hard-disk controller card.

Its highest volume product is the HTO card, a hard-disk controller card that is sold both as an OEM product and through retail distribution.

Microsoft called again on Paterson to write a version of DOS for the HTO card, that became the core of the MSX operating system popular in Japanese home computers and administered by Microsoft Far East in Tokyo. This time, however, Paterson was able to negotiate his own payment.

Besides a fee, he obtained MS-DOS and MSX-DOS OEM licenses for Falcon Technology, as well as options for MS-Networks.

"I wish I'd done that with DOS" in 1981, he says. In addition, Falcon has some OEM agreements with Microsoft and does some testing as well.

Paterson uses MS-DOS 2 in his work. "MS-DOS has taken on a lot of Unix flavors and gotten generalized," he observes. "It keeps getting slower and slower." But he's still pleased to claim it.

"I made my one contribution. I feel like I had an effect on history. If I hadn't been there to write it, I guess it would've been CP/M 86," he says.

There is even an occasional call from Microsoft's DOS group, Paterson adds.

"Once they said they had a question about the 'Timcode.' That's what they called the stuff I wrote that nobody else understands."

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In Depth

When the sun goes down, so do China's computers



By JOHN MAIER

*The woods are black and a wind
assails the grasses
Yet the general tries night archery
And next morning he finds his
white-plumed arrow
Pointed deep in the hard rock
— Tang Dynasty (A.D. 618-907) poem*

An American MIS director would not feel uncomfortable walking into a computer center in China. But beyond the familiar hardware, visitors find mismanagement and waste. No good manager can tolerate waste, and China can ill afford it.

In 1986, a decade after the world's first computer became operational, the People's Republic of China designed and built its own computer, a vacuum tube model, at the Chinese Academy of Sciences Institute of Computing Technology, located outside Beijing.

Today, China's inventory of computers includes a large number of imports from the West as well as indigenous models designed and manufactured to ISO standards and conforming to ANSI specifications. The world of computers — including China — is moving toward a synergy in which IF and GOTO become a universal logic as well as part of a universal language.

I wish everything were that simple. Though simplicity is the elegance that mathematicians seek and the methodology for which managers strive, it is not always the way in which things are done in China.

Modernization drive

China is a country 1.19 times the area of the U.S. with a population of more than one billion people, four times that of the U.S. When we discuss management in China, we are dealing with a very large environment. To consider today's China in the proper context, we have to take into account many political and social sources. China, after the 10-year chaos of the Cultural Revolution, is modernizing under Chinese senior statesman Deng Xiaoping's leadership.

China's modernization drive is, in fact, substantive. It includes a marked movement away from a dominating,

centrally planned economy and toward market forces and a legislative structure of guarantees both for China's citizens and for foreign individuals and businesses in China.

Although China is still socialist, with the state owning all land and most means of production, its economy recently has been accused of "heating up," or growing too fast.

Private markets now account for more than 15% of the country's retail business. China's centralized, static economy is beginning to react to market influences and the shifts of supply and demand.

As of early this year, U.S. companies' annual business with China — not including their substantial investments — totaled \$6 billion, a figure that is expected to increase. The U.S. is China's largest export partner and its third largest import partner, following Japan and Hong Kong.

We now see hundreds of U.S. and other Western multinationals and companies and banks, with representative offices in Beijing, Shanghai, Guangzhou and elsewhere in China. Japanese banks often maintain branch offices in larger Chinese provincial capitals.

U.S. investments in China are growing, and joint ventures between the two countries are routine; Intel Corp., Burroughs Corp. and Wang Laboratories, Inc., for example, have negotiated agreements.

In part, this is all contributing to the general global shift of the locus of economic activity from the Atlantic Ocean to the Pacific Rim countries. That is, the U.S. now does more business with Asia and the Pacific countries than it does with Europe. With an "open" China, Asia's map is now larger by one billion people.

Technology transfer

Deeply involved in all of this activity are U.S. and, to a lesser degree, other foreign computer vendors. In the past two years, these vendors, including Digital Equipment Corp., IBM, Data General Corp., Perkin-Elmer Corp., Wang and Honeywell, Inc., have conducted approximately one-half billion dollars' worth of business in China and have installed a wide variety of systems.

The average American MIS director would not feel uncomfortable walking into a computer center in China. His first impression would be one of

Maier is a computer scientist currently based in Fort Worth, Texas, specializing in computer, telecommunications and satellite technologies in developing countries. At the invitation of the People's Republic of China, he recently spent a year lecturing as a professor of computer science.

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familiar surroundings: raised floors, air-conditioning, CPUs and operators' consoles, tape drives and disk units — many with familiar vendors' labels on them. People would be performing routine computer tasks.

The U.S. vendors have generally done a good job installing these systems, a job for which China has spent a large amount of its precious foreign currency. Installations, however, are only a start.

The impression of normalcy is only an initial one. Subtle differences are systemic to almost all of China and require a bit of probing to discern. In fact, China's new computer resources are mismanaged and seriously wasted. Waste is something a good manager cannot tolerate, and it is something China can ill afford.

There are two fundamental constraints to the performance of com-

puters and all automation in China today. The first constraint is the physical environment — hardware and engineering. The second constraint is ideological, or attitudinal, and is more subtle, therefore, more difficult to deal with.

Ultimately — for China and the rest of the world — managers must determine how and for what computers are to be used, what their role is in society and what the structure of that society is.

We should recall our own technological milieu, as does Roderick Macleod, president of International Technology Development Corp. and the Shanghai Software Consortium who has more than a decade of technologically related experience with China:

"In developed countries, commercial computer technology evolved over 30 years in an environment fueled and enriched by 40 years of government and military technology and 50 years of pure and applied research in cybernetics, industrial engineering, management and organization and so on.

"The computer scientists are embedded in a very complex network of related technologies, which both use and sustain them. Probably only a few historians understand the whole network, and those who do are not interested in or able to implement change, especially in China," Macleod says.

In the U.S., we live in a society and economy of pervasive computer activity, as if the emergent side of a Kuhnian paradigm. We have formed certain generalized concepts of "progress," "modernization," "the future," "change" and "automation"; we also maintain certain accepted standards of system performance.

For example, we now take for granted computer networks, massive systems such as those used by banks or the Internal Revenue Service, and the idea that any economic activity of any substantive size in the country will be automated.

In our national research activities, we are now building "supra-networks" — networks of networks. When you add telecommunications, the U.S. possesses a vast infrastructure, supported by a growing national computer work force. We built an information technology society, and it affects the way we think about many human activities.

Instruments of revolution

Although other countries, particularly other developing countries, do not necessarily need to evolve in the same technological manner, there is every reason to believe that computers are, in fact, the instruments of a fundamental revolution both in science and in society, and that this will probably become true globally. Singapore, Hong Kong and Japan each illustrate this revolution.

China now is committed to modernization as a national policy and spends scarce foreign currency to import computers as a tool of this policy. In 1978, China's then Vice-Premier for Science and Technology, at an important national conference, identified computer science and networking capabilities, along with telecommunications, as critical national priorities.

China does not yet have an information technology infrastructure, although with recently installed hard-

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ware, a foundation is slowly being built. Information technology will affect all of China's basic infrastructures, as computer technology may be the only science common to all facets of modern life.

Physical limitations

A common environmental problem in some areas of China, even in its large cities, stems from regular electrical power outages. Managers cannot run automated systems that contain critical information under these conditions. The critical nature of this problem helps clarify a recent U.S. decision to reduce controls on nuclear power technology and allow the sale of that technology to China.

In Guangzhou, a city equivalent in size to San Francisco, certain areas receive no electricity one day each week. Some of the installations I visited contained backup power systems, but this recent development results only from the growing realization that once installed, information processing systems do become essential to an organization's functioning.

The more prevalent attitude among the Chinese, even among managers, holds that having no electricity means a day off — literally, a time for everybody to go shopping.

Another current limitation of the physical environment is that, while networking may be appropriate and needed by China, the country does not yet

have data-quality communications capabilities — not even between major metropolitan areas, much less nationally.

I did not encounter a single computer network in China, except for some very limited microcomputer research being done in university laboratories — of course, these did not need long-haul communications.

China's fledgling aerospace efforts may have constructed some data communications capabilities, but there has been no indication of a spin-off to other sectors, much less the existence of the necessarily complex topologies and protocols needed for sophisticated networking to be developed to diverse users.

Therefore, all installations in China are stand-alone, almost embryonic, awaiting a networking backbone, as was the experience of the U.S. in the 1960s. Right now, in fact, there does not yet seem to be a widespread desire among Chinese applications developers, except perhaps among scientists, for the topologies that networking opens up. Even if an organization — the Bank of China and its many branches, for example — did recognize the need, it would not yet be feasible to network.

A quick and elegant solution to this situation would be the broadcast communications geostationary satellite that, by mutual agreement, the U.S. could sell to China. China would then bypass Western experience by not having to construct an extensive, and possibly more expensive, terrestrial communications capability. An Alcatel broadband-type networking solution might do well for China's

widely dispersed data communications users.

This agreement has not yet been consummated, although both President Reagan and Vice-President Bush mentioned it on separate visits to China.

Because foreign CPUs are becoming common in China, another environmental problem for China's MIS managers stems from the current quality of domestic logistical support. For a variety of reasons, support for domestic hardware systems and other products by their suppliers is most likely not acceptable.

Additionally, while IBM, for example, has moved its headquarters for its Far East operations from North Tarrytown, N.Y., to Tokyo and assigned 100 staff members to China, support from some Western suppliers for some installations can be spotty, almost nonresponsive, with frustrating delays.

The long run

Sometimes misunderstandings arise in the relations between a system's buyer and the vendor involved. This situation will improve, I am sure, because it behooves Western

vendors in China not to think in terms of the short run and of the quick buck.

With China setting modernization goals a decade into the future and beyond, fueling the expectation that business will grow, technology transfer people from the West should be in China

to stay.

However, wise U.S. managers who think strategically will realize that China's needs will evolve beyond hardware acquisition to conceptualization, development and implementation of applications — areas in which help is equally needed.

Reliable power, available telecommunications and responsive logistical support would take care of some of the pressing headaches of computer managers in China today. Ten years from now, we should be able to look at China and say that we both did a good job.

Ideational constraints

The second general constraint is more elusive, thus ultimately more difficult to resolve, than the environmental constraint. It is a condition of attitudes and vision, a condition of norms. Attitudes are as likely to be a problem (by U.S. standards) among Chinese managers as among those they manage. No single symptom describes fully what can only be considered to be a societal and structural mind-set.

When China first began developing and using computers, the machines belonged solely to scientists and engineers; applications were invariably mathematical, or were oriented toward engineering or scientific uses.

This statement held true in the U.S. at first, too. Now, however, computers here are frequently more valuable for processing information than for crunching numbers.

China is moving very slowly into the information processing arena.

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and that slowness constitutes waste — both in lost opportunity and opportunity costs. In China, computers are still viewed primarily as number crunchers — a sustained myopic bias.

Perhaps Chinese civilization, which so values the beauty of the brush-written ideogram, cannot assimilate the thought of machines assuming this task, although actually all of the I/O and other requirements of Chinese word processing have been resolved.

Perhaps it is because machines do not need to be used when there is such a surfeit of labor, although this attitude obscures some of the unique capabilities of computerized information processing.

At a minimum, computers can be used to conserve and manage materials, to optimize supply and distribu-

tion networks, to improve quality control of processes and services and to support better planning at all levels of society.

Perhaps what we see in China, a country noted for bureaucratic obfuscation and inertia, is that Chinese organizational structures do not yet accept automation, which is intended to streamline and accelerate the

activities of those organizations. Nevertheless, higher level Chinese officials have now authorized widespread procurements of computer hardware.

I think, in part, that Chinese managers feel that once they have acquired the computer hardware, they are then "modern," without any real thought given to the fact that it is

99

Chinese managers feel once they have acquired the computer hardware, they are then 'modern,' without any real thought to the application's implementation, its acceptance and its use. It is an old lesson in Chinese history of the form vs. the substance of modernization.

the application's implementation, its acceptance and use that counts. It is an old lesson in Chinese history of the form vs. the substance of modernization dating back to the middle of the 19th century, when China, along with Japan, first began acquiring railroads and artillery from the West.

Japan assimilated and synthesized this machinery. China did not, preferring to consider Western technology as essentially alien. China's Qing Dynasty leaders did not perceive nor comprehend the symbiosis inherent in the lineage of science, technology and change.

However, we cannot ascribe this condition merely to being Chinese, for it is belied by the high standard of performance of the Chinese in the U.S., Europe, Hong Kong, Singapore and elsewhere, where not infrequently they excel in high technologies.

Perhaps we can, in part, say that it is the condition of being on the before side of the information technology paradigm. Perhaps the 10,000 Chinese graduate students now in the U.S. will carry with them on returning to China and to managerial responsibilities a quantitative and qualitative shift in perceptions. These students might well personify China's future.

New machines misunderstood

In China, managers in their 40s and 50s preside over some slick new machinery that they have not been fully trained to use. In addition, many do not really understand for what purpose the machines are to be used.

In one site, a DEC VAX was turned on at 8 a.m., off at noon for lunch, back on at 2:30 p.m. after a nap and then off at the end of the work day. I told managers there that U.S. users run computers 24 hours a day to reduce wear and tear — that these machines are not a resource that you conserve by saving power.

In every installation I visited, the terminals stood tightly clustered near the system; none were distributed to offices or other locations. The same phenomenon took place in the early days of computing in the U.S. But now we view the computer as a background tool that we should be able to access anywhere, and our networking capabilities support remote computing handily.

Another time, I encountered an individual logging wall clock hours tracking users at different terminals. Again, I mentioned that what really counted were machine resources such as CPU seconds — that, in fact, the machine kept track of everything that was happening, and for what amount of time, within the system. The system managed itself.

Generally, although I realized that the machines were newly installed, I found that they were frequently underutilized, almost to the point of waste. I encountered some cases in which access for some end users was withheld in the misbelief that they might "use up" the machine. In addition, access carried status, something apparently more important to the manager than productivity.

I logged on to one system but was warned not to damage another user's files, when I knew that the system would not allow me to do that. At another installation, a deputy director pointed at some machines under his responsibility and identified

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them as Wang computers, which they were not.

Learning the value of software

Software management, engineering and productivity combined are almost an art, one with which China has sparse experience. China has yet to learn the real value of software, especially the cost of developmental man-years. For this reason, Western vendors find the most difficulty in marketing, negotiating and transferring software

technology into China.

On one occasion, I assisted a group in formulating a long-range budget that included some large software applications. I was amazed when the managers told me that the salaries of programmers and analysts should not be computed into the budget because these individuals worked for the organization anyway. These managers need training, but few qualified trainers can be found in China.

Additionally, many managers do not have the experience to manage complicated planning reliably. Inaccurate estimates given to higher managers, for example, can cause disaffection on their part with the automation process and a subsequent loss of appreciation of its value.

Equally, end users need education and training. I encountered one well-constructed management information system, developed

with much effort, that the end-user organization — although feigning acceptance throughout the entire development cycle — refused to use because the project would have restructured the flow of information through the organization.

In this regard, Chinese organizations may not be any different from their Western counterparts: It has taken a long time for the MIS director to move up in Western corporate organizational

charts as well.

Currently, China estimates that it supports approximately 100,000 computer professionals — fewer than can be found within a 16-mile radius of Stanford University. By my estimate, China's 800 universities and colleges will produce at present rates only another 35,000 computer professionals by 1995.

Moreover, there are only three men in the country empowered to confer the Ph.D. in computer science. It follows from these statistics that China will experience a serious shortfall of computer professionals in attempting to meet its own goals for the year 2000.

By contrast, the U.S. this year employs an estimated one million computer professionals, and U.S. schools award approximately 260 Ph.D.s in computer science every year. Even so, we forecast our own shortage of computer personnel into the next decade.

China will not acquire modernization simply by purchasing hardware. China's main concern now, and for some time to come, clearly lies in the training of a generation of computer professionals.

The "iron rice bowl"

The question of opportunity leads to another systemic consideration about China, a socialist country with a centrally planned economy as well as active market forces.

Until recently in China, all individuals, upon entering adulthood, were assigned by the bureaucracy to various work units that made up the work force of the country. They were thus allocated in the same manner as any other resource.

Almost invariably, they worked in that unit for their entire career, without incentive but also without fear of being fired.

Management — whether upper or lower, individual or committee — did not have the prerogative either to hire or fire. There was essentially no job mobility for anyone seeking greater opportunity. The system was safe, static and inefficient.

Under senior statesman Deng, broad changes are occurring, but not enough have taken place, and those that have frequently come up against conservative opposition.

For example, a manager in China may run a computer facility with 35 programmers and analysts. All his workers know that they cannot change jobs or be fired and that they will be there to age 60. The manager knows he does not have much leverage. In fact, he may not even care, since he, too, shares the same position.

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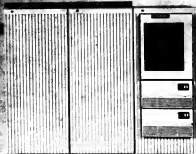
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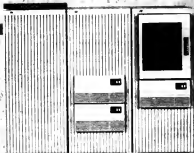
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China may take years to finalize. The average Chinese professional will still never have to write a resume because he will never make a career move other than by consensus of his coworkers.

This model — called the "Iron Rice Bowl" — perhaps suited China when starvation loomed as a real possibility, and stability fostered the best environment. However, that no longer describes the reality. China's top leaders are now set on modernizing, on catching up with advanced countries by the first quarter of the next century. To quote Deng, "If the Open Door Policy is changed, it will only be to open it more; it is a fundamental policy of China."

In some instances, a young computer scientist in China may now go job hunting. And, in some instances, a manager may recruit talent. Thus,

There is every reason to believe that computers are, in fact, the instruments of a revolution both in science and in society and that this will become true globally. Singapore, Hong Kong and Japan are examples of this revolution.

there exists a bit of a free job market.

You will not see employment ads in Chinese newspapers, but consulting is now allowed as an incentive for the individual to earn extra income and as a method to bring new ideas into an organization.

Yet the pace of change in China during the next 15 years mandates some structural changes. Today, Chi-

na is 80% agricultural, but that figure is expected to decline to 60% or less by the year 2000.

Interestingly, like the U.S., which first used computers to tabulate the 1980 census, China, in its first large national DP project, conducted a thorough national census in 1982. The census used 20 IBM 4300 and 10 Wang VS systems, all financed by the United Nations Development Pro-

gram. These computers now serve provincial DP centers.

China has also received approximately \$250 million during the past two years in a World Bank China Universities Automation Loan to provide hardware for universities. That amount, now almost fully spent, will likely be increased.

Recommendation for the future

The preceding assessment of China's computer resource management was given not as criticism but rather as an objective visitor's view of the state of computer science in China. In the U.S., we also routinely review our computer activities. We feel information technology is a resource too important and too expensive not to use to maximum benefit.

In the U.S., computers are generally believed to contribute to the quality of life, with some limitations. The working relationships we now build with China involve professional dialogues based on that assumption.

In the 1960s, both the U.S. National Academy of Sciences and the White House Office of Science and Technology Policy formed commissions regarding the role and direction of computer science in the U.S. The watershed work these commissions completed helped articulate national needs and future directions.

China now needs to take on a similar task publicly, perhaps with international participation. This project could be done by the Chinese Academy of Sciences or the State Science and Technology Commission, part of the State Council, China's equivalent of the U.S. Cabinet.

Eight years ago, I suggested to the U.S. government that the way to build bridges with China lay in technology, with increased — not restricted — export. I argued that high technology was the U.S.' best product, that China was sincere in its commitment to peaceful modernization and improved quality of life for the Chinese people. I argued that our strongest and most reliable bonds would emerge from extending the links of information technology.

At that time, I encountered astute opposition from the federal government. A half-billion dollars later, I feel somewhat vindicated in my predictions but still see a long road ahead if we are to do the job well.

Promoting automation

China should not slow its efforts but should continue to view automation as a national, regional and local need. The Chinese should not oppose bringing in managerial as well as technical expertise for important projects, including joining a broad national commission to evaluate China's efforts and future needs.

Computer science holds promise of an attractive future, and it is youth, almost universally, which sees the future as open. Without the accumulated biases of mature managers, China's young people grow eager and enthusiastic about the technology, and they understand that to play with it is to get to know it.

Finally, Chinese managers must give increased attention to understanding the economics of software. Someone once correctly defined software as "everything you can't see or touch." That is why, perhaps, it is the most difficult to appreciate. But we have learned that it is of even greater value than hardware, for it is the algorithm for failure or success. ■

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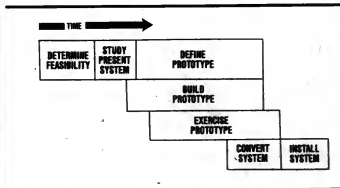
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In Depth

The prototyping methodology: Designing right the first time



Many information systems managers view prototyping as a quick-and-dirty approach that talented people use for urgent systems projects. But prototyping is a methodology; you can teach, measure, compare and modify it.

By KENNETH LANTZ

Numerous articles about prototyping have appeared recently. Many organizations have tried it. Most people think they know what it means. But prototyping is not as easy as it sounds, and most organizations are not receiving the full benefits of the technique.

Many information systems managers view prototyping as a quick-and-dirty approach that talented people use for urgent systems projects. These people often seem to be winging it when they are prototyping, taking shortcuts that eliminate necessary steps in the system development process.

For this reason, information systems management is often cautious about using prototyping. Even if staffs used the technique once or twice on critical projects, prototyping was not considered systematic enough for them to use it generally. Managers want a methodology for all the advantages that a methodology brings.

But prototyping is a methodology; it is a collection of methods. It is done in a systematic way, and that way can be described. A methodology is something you should be able to teach, schedule, measure, compare and modify.

Prototyping is based on building a model of the system to be developed.

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The initial model should include the major program modules, the data base, screens, reports and the inputs and outputs that the system will use for communicating with other, interfacing systems.

Prototyping then uses this model to design a system. The initial version of the prototype contains its designer's understanding of the data base, screens and reports. As the end user and information systems staff begin to work with the prototype, they will change it and complete the final version — the design of the system.

Prototyping also uses the model to implement the system. The initial version of the prototype will consist of programs written in some language, possibly a fourth-generation language. At first, these programs may perform little processing; they may actually dummy it instead. For example, a program that produces data for a report may generate the data from hard coding instead of extracting it from the data base.

Using the model for testing

As the prototyping process continues, newer versions of programs that perform more closely to the specifications of the ultimate system will replace the original versions. For example, a program that actually extracts data for a report from a data base may replace one that dummied out data.

Prototyping also uses the model to perform both the system and the acceptance testing of the system. The initial version of the prototype, as well as all subsequent versions,

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It is difficult for those who are used to the life cycle methodologies to imagine beginning programming before the system design has been completed. It is even more difficult for them to think of beginning system testing before the programming has been finished. Even if they could imagine these things, they would never do them.

communicates with system test versions of feeding systems and systems to be fed. Therefore, the prototype always runs in system test mode. And since the user works with the prototype from the beginning, the user performs acceptance testing of the prototype from the beginning.

Prototyping uses the model for installing the system as well. Those who must learn how to work with the production system as part of the installation process — normally end users — learn how to use it first by working with the prototype. The prototype produces material, such as sample screens and reports, which is useful for the documentation written as part of the system installation.

In addition, part of the prototyping of a system involves prototyping any conversion process required for installing the system. So when users

finish exercising the prototype, that prototype becomes the system.

Classic life cycle vs. prototyping

In the plan for a classic, nonprototyping, life cycle-style project, the various project phases usually follow each other serially. About the only overlapping comes from training the end users at the same time as converting to the new system.

The life cycle methodologies emphasize scheduling and meeting milestones, producing documentation at the milestones and getting sign-offs on it — no sign-off being more important than the end users' sign-off of the requirements.

These methodologies may lead us to view the systems development process as a set of rigorously distinct phases performed at separate times. Each phase depends on the immediately preceding phase, and those doing the work may not begin the next one before the previous one has been completed.

It is difficult for those who are used to the life cycle methodologies to imagine beginning programming before the system design has been completed. It is even more difficult for them to think of beginning system testing before the programming has been finished. Moreover, even if they could imagine these things, they would never do them.

Those of us who have designed and implemented information systems recall often feeling a strong impulse to iterate what we were doing. Maybe we felt we should somehow repeat at least part of the phase we were working on. Perhaps we thought we should examine elements again that had been determined in earlier phases. Following the life cycle methodologies helped us.

But the life cycle methodology, especially the milestone dates that we promised to meet, kept us from succumbing to the temptation to iterate. After all, if we ever started, how would we know when to stop?

Overlapping phases

One different aspect about the prototyping plan is the overlapping of most of the project phases. This implies that prototyping provides the iteration that is often sought in developing information systems. Actually, prototyping provides more than an iteration of phases; it provides a continuation of phases.

The requirements definition begins after the present system has been studied. Before the requirements definition is completed, the design begins. Soon after it has begun, the programming begins. Shortly after that, the testing, acceptance testing and end-user training begin.

The milestone deadlines for completing the requirements definition, design, programming, testing and acceptance testing usually fall on the same date. The completion of end-user training probably occurs on the same date as the completion of conversion. Installation begins after that.

Overlapping phases does not mean that features of the system are designed before there are requirements for them. Nor does it mean that segments are programmed before they have been designed. And how could something be tested before it was programmed?

What it does mean is that whatever is learned during acceptance testing influences the requirements for



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additional parts of the system and, subsequently, the design, programming, testing, acceptance testing and training. Changes in the design certainly affect the programming. Programming affects the testing. Everything that goes before affects the end user, who learns the system during the acceptance testing. So in a sense, the work of these phases continues until they all have been completed.

Much of the work of defining requirements will be finished before most of acceptance testing is done. Likewise, much of the design will have been completed before most of the system testing is done. Yet, needs discovered during system testing or end-user training or acceptance testing can and should affect requirements definition, design and programming.

This description might imply that the prototyping methodology is simplistic and does not include all the elements that must be a part of any systems development methodology. That is not true. Prototyping is streamlined, but it is not simplistic.

The streamlined phases include the following:

- Define a prototype.
- Build a prototype.
- Exercise the prototype.

Flaws in current methodologies

James Wetherbe describes the current state of information systems well when he declares that the major problems with our current approaches are that they take too long and that they don't produce the right system the first time [CW, April 26, 1982].

The following is a list of some of the principal problems with current methodologies:

- Methodologies are thorough but do not please end users.
- They produce extensive documentation but do not decrease communication problems.
- They identify project steps but do not decrease calendar time needed.
- They describe a system thoroughly but do not guarantee it is the right system.
- They delineate skills needed but do not cut manpower needed.
- They track project costs but do not reduce them.
- The advantages of prototyping, in contrast, include the following:
 - Prototyping pleases users.
 - It reduces development cost.
 - It decreases communication problems.
 - It lowers operations costs.
 - It slashes calendar time required.
 - It produces the right system the first time.
 - It cuts manpower needed for development.

Prototyping pleases users. Instead of only going to requirements meetings and walk-throughs, reviewing screen and report layouts and signing off various documents, many of which they may not fully understand, end users actively participate in the design and development of the system on a day-to-day basis.

Prototyping makes end users feel far more involved with the new system than the life cycle methodology ever could. End users can exercise the system every day. If the system fails to meet their needs, they can request modifications and see them quickly.

Prototyping reduces the total cost of system development. According to Lee Gremillion and Philip Byburn in their essay, "Blinking the Systems Development Bottleneck," "A number of companies report that total systems development costs [incurred] by the prototype approach are usually less than 25% of the costs [incurred] with the traditional approach" (*Harvard Business Review*, Vol. 61, No. 2, March/April 1983, page 133).

Prototyping decreases communication problems. not only between end users and information systems people but also between those working on the new system being prototyped and those working on systems with which it must communicate. Since end users actively participate in the design and development of the system, they do not experience the severe communication problems that sometimes occur with other methodologies.

Also, since the prototype itself, not paper, is the main medium of communication of system functions between end users and information systems staff, these people misunderstand each other much less often. People can tell you what they dislike about an existing system more easily than they can tell you what they want in a system you are designing on paper.

Systems development plans usually leave the system testing of a new system until the very end of the system. And the plan never seems to allow enough time for correcting problems if system testing does not go well. Needless to say, problems often do occur, and fixing them adds an embarrassing delay to installing a new system.

In contrast, the prototyping methodology requires that, from the first, the prototype be brought up in system test mode, so it may communicate with any systems that feed it or any that it must feed. System interface problems should be solved as soon as they are found, because the prototype may not run properly until they are corrected.

Also, as prototyping progresses, if any modifications to the prototype impair its communications with interfacing systems, they will be detected and quickly corrected.

Prototyping lowers operations costs. Systems developed using prototyping use fewer computer resources. This advantage is the opposite of what many people expect; they think all systems developed by prototyping contain at least some code written in a fourth-generation language, making the systems into computer resource hogs.

But the use of fourth-generation languages is not a necessary part of prototyping, as discussed below. Certainly, if operational efficiency is a criterion for a system and if the use of fourth-generation languages would prevent optimal efficiency, then a system developed through prototyping would not contain programs written in these languages. Remember, though, that fourth-generation languages are becoming more efficient day by day.

So, leaving the inappropriate use of fourth-generation languages aside, how are systems developed through prototyping more efficient in the use of computer resources than systems developed in other ways?

First, prototyping produces fewer

reports and screens programmed to meet the "I think I need a . . ." requirement. Users often think they need a report or screen which they never use after the system is installed. Systems developed through prototyping do not usually produce such reports and screens.

Second, systems developed through prototyping contain fewer validations and unnecessary controls. End users realize what it will cost and the time it will take to add validations that might be nice but that they do not feel are necessary when they learn how the system will operate.

Also, information systems staff members do not add controls that they might have otherwise added because formerly they did not know how end users would work with the system.

Prototyping slashes the calendar time required to complete a project. Since the work of several phases is done concurrently, a project done through prototyping methodology should always absorb less calendar time than one done with the life

cycle methodology, unless significantly fewer resources are assigned to the prototyping methodology project.

For example, if a project that would require 10 people to complete using a life cycle methodology is staffed with only two people under the prototyping methodology, it will probably require more calendar time with prototyping, despite the overlapping of phases that prototyping provides.

Prototyping produces the right system the first time. It would be difficult for prototyping to do otherwise, with the active participation of end users in the system design and development and the constant running of the prototype alongside interfacing systems. Also, the requirements that are the basis of the system are not merely theoretical; they are developed from actual experiences with the prototype.

Prototyping cuts the manpower needed for a project compared with what would be required using a life cycle methodology. The prototyping methodology cuts manpower

Prototyping applications

Where should prototyping be used and on what types of projects? Some information systems managers would limit the use of prototyping to the development of systems that are poorly defined. Others would limit it to systems that are relatively small. In fact, some claim that the use of prototyping tends to keep projects smaller — thus, more manageable.

Frank Wenger and others hold that prototyping applies best to simulating human interaction with systems, using such methodologies, such as structured programming, for the parts of the system with which people do communicate directly will increase productivity [CW, Aug. 15, 1984].

Certainly, many professionals will tell you, prototyping should not be used for installing software packages. Nevertheless, prototyping has all these applications:

- On-line systems.
- Batch systems.
- Packages.
- Enhancements and modifications.

Prototyping is useful in developing on-line systems, which are difficult even for systems designers to visualize, if they are only working on paper. Using some kind of prototyping, at least for the flow of information to and from screens, is a natural solution.

Many designers started prototyping when they realized the screen mapper, part of a fourth-generation language they had acquired, would help.

Prototyping's usefulness for batch systems is difficult for many people to understand. But also some problems arise in developing batch systems on on-line systems. Users have difficulty visualizing what they want a system to do and evaluating requirements documentation. Prototyping directly addresses these problems.

Prototyping is also useful in systems that are poorly defined. The prototyping methodology can clarify the purpose, function, content and that domain. If the definition is in some form of prototyping, the prototyping methodology and procedures should find all the advantages of prototyping.

Some staff members may doubt this approach will decrease calendar time. But it will, if you consider how often adjustments need to be made in a package immediately after installation.

Even if no modifications to a package are planned, installing it first as a prototype with one data file enables staff to find it, to ensure it works and users' needs, to train staff and users, to ensure and information services staff understand it and to determine whether it works well with interfacing systems.

Prototyping slashes calendar

Prototyping also slashes the package selection process. Usually, a package selection team draws so closely between two or three strong candidates, but even if there is only one strong candidate that appears to be a shoe-in, prototyping will help maintain under a good choice.

Most package experts advise trial use before purchase or, at least, before a purchase is final. Use it as a prototype version to help evaluate the package's strengths and weaknesses.

"Prototyping is useful for enhancements and modifications to existing systems. Even if a test system does not exist, information systems staff members need only to prototype that part of the system that needs changes."

If an enhancement or modification is to be relatively minor, bringing up a prototype of it should be a surprisingly minor task. After all, staff members should test the changes before a formal part of the production system. If a change is large, the benefits of prototyping and its applicability match those for new systems.

—JIMMY LAMBERT

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needs in the following ways:

- Prototyping does not require excessive documentation.

- Good communication is more efficient than poor communication.

- No last-minute surprises requiring major modifications turn up.

- Much of end-user training is a by-product of development, not a separate phase.

Excessive documentation is not needed with the prototyping methodology as it may be with a life cycle methodology. Because communications are often not good between end users and information systems staff under traditional development methods, documenting the system in great detail seems to be good business practice.

Some view such documentation as protection for information systems. Although essential documentation is a part of the prototyping methodology, the work required to produce documentation for reasons of protection does not need to be done.

Time-saving communication

Good communication requires less time than poor communication. Often, life cycle review and status meetings get off the track. Documentation and correspondence often seem to confuse the recipients.

When people who are supposed to work together fail to understand one another, it seems to take extra time to communicate simple information. But when people are working together continuously on a project they all understand, much more is communicated in much less time.

The constant, incremental development and testing (both system and acceptance), which are an important aspect of prototyping, keep any one problem from becoming a major consumer of time. Also, no surprises requiring major reworking occur during testing.

How many times, using traditional methodologies, has a flaw been discovered that required major modifications before a system could be installed? The likelihood of finding such flaws is much lower using the prototyping methodology.

What is needed to prototype

Do you really need fourth-generation languages, report writers, data base management systems (DBMS) or data dictionaries? Prototyping is certainly easier with them than it is without them. And these aids have generally been available to people when they began prototyping.

Just having fourth-generation languages available does not guarantee that a company can prototype. And using them does not necessarily mean that the staff is prototyping. Many organizations that have all those aids do not prototype, or, if they do, they do not feel that their prototyping is productive.

Also, giving too much attention to these aids may cloud an important issue: What makes prototyping work?

The essential response is that proper project management and the use of a methodology make prototyping work. No matter how good the tools available to information sys-

tems, good project management is essential to their successful use of the tools. Also, a methodology makes prototyping a tool and not just an art.

But, in addition to these essential elements, what is it at the nuts-and-bolts level that makes prototyping work? The four principal ingredients to successful prototyping follow:

- Understanding the data.

- Moving data through the system and to and from connecting systems.

- Exercising the prototype frequently.

- Building and modifying the prototype quickly.

The information systems staff needs to understand the data to design and build the initial prototype model. Screens and data do not show data realistically are not worth producing.

Also, prototyping will go more smoothly if information systems bases the initial version of the data base on a good understanding of the data. For example, data in the prototype may be accurate to within 75% of the content and structure of the production version.

Finally, the structure of the initial model itself depends heavily on the data base, screens, reports, inputs and outputs; they, in turn, depend on an understanding of the data.

Moving data through the system and to and from connecting systems provides many of the principal benefits of prototyping. It makes both systems and acceptance testing work well by showing what happens when users enter input data and when they modify its processing.

The feeling of realism that data movement gives also promotes end-user familiarity with the system. Since the core of prototyping involves using the model, end users and information systems people perform its most essential function as they work together exercising it.

How often to exercise the prototype remains a matter of judgment. If too much time elapses between prototyping sessions and users' experience with the prototype gets stale, information systems staff may begin documenting more elaborately. These extra steps may rob the company of many of the advantages of prototyping.

Being able to build and to modify the prototype quickly is important for exercising it frequently. But the speed required for modifications is relative to other factors.

If, for example, different tasks are being performed in five successive exercise sessions, no one may want to see modifications resulting from the first session until after the end of the fifth session.

Tools to enhance prototyping

Tools that will help staff members prototype amount to tools that will help them understand and move the data as well as exercise and modify the prototype. None of them may be essential, but using at least some of them will help a company to prototype.

No specific set of tools is best for

prototyping. Using one data dictionary may not be better than using another. Writing programs with one fourth-generation language may not be better than writing them with another. But using a data dictionary may be better than manually controlling information about the data. And using a fourth-generation language may be better than coding every line

in Cobol. A data dictionary should help to record and to organize information about data. This should aid the staff in understanding the data.

An interactive testing system allows the staff to use a terminal to change programs quickly, to

submit frequent tests and to review the results of test sessions without having to wait for batch outputs. Using interactive testing helps users to exercise the prototype often, to modify it quickly and thus to move data between its components.

A test data generator produces test data to use for moving data through the system and exercising the prototype.

Although it may seem obvious, library control of program modules aids in making quick changes to the prototype and in moving data between system components. Library control provides such features as version control of programs and data base definitions as well as multiple uses of the same program (although multiple use may be a feature of the operating system).

Quickly modifying those parts of a prototype written in a fourth-generation language should be easy to do. The features of the fourth-generation language that are particularly helpful are the report writer, screen painter and query language. You may obtain some or all of these separately without getting a fourth-generation language.

One additional consideration is that as more features are added to the prototype, programming them in a fourth-generation language may become more complex than programming them in a problem-solution language.

A relational DBMS, used either alone or as part of a fourth-generation language, also may help in modifying the data base design, especially in the early stages of prototyping.

An emphatic 'yes'

From time to time people ask, "What do you really mean by prototyping?" They wonder, "Do you actually mean doing such things as setting up the data base and the screens for updating it?"

From information systems managers, the answer must be an emphatic "Yes." Prototyping is a methodology; it covers many aspects of system development through end-user training. It is done in a systematic way, and that way can be described.

The benefits of prototyping and its applicability are identical for new systems or for major modifications: eliminating communication problems, pleasing end users and helping to install the right system the first time.

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NEW PRODUCTS

Index offers Excelerator upgrades

Index Technology Corp. of Cambridge, Mass., has announced Version 1.6 of its Excelerator systems design software as well as the availability of a version for Wang Laboratories, Inc. and Texas Instruments, Inc. Professional Computers.

Excelerator is said to be a workbench for use in systems analysis and design on personal computers. It offers system design graphics, screen and report design, analysis reports, data sharing between analysts, document production and a dictionary.

The software costs \$8,400 per single copy; volume discounts are available.

Version 1.6 will allow users to analyze entities and relationships in the project dictionary with fewer steps, the vendor said. It will also add 12 entity relationships to the more than 80 relationships that the dictionary automatically tracks.

Additional graphics features reportedly allow users to describe to the project dictionary all connections in structure graphs, permitting storage and tracking of information about the connections.

Includes block security device

Version 1.6 also includes a block security device that replaces the key diskettes and board-mounted devices currently used with Excelerator. The block attaches to the parallel or serial port of the CPU, but leaves the port free for other interfaces.

The vendor said the Wang version of Excelerator 1.6 operates on Wang's PC-XC and PC-SB microcomputers running under Wang's 2.01 version and above of Microsoft Corp.'s MS-DOS. A monochrome monitor, graphics card, Microsoft serial mouse, 10M-byte hard disk and 640K bytes of internal memory are required.

The Texas Instruments version of 1.6 operates under TI's Version 2.11A and above of Microsoft's MS-DOS. It requires a TI video display adapter with three-plane graphics adapter, a 10M-byte hard disk, 640K bytes of internal memory and a Logitech, Inc. mouse.

Laserjet 500 Plus launched

HP printer features two 250-sheet paper input bins

Hewlett-Packard Co. of Palo Alto, Calif., has announced the HP Laserjet 500 Plus printer.

The Laserjet 500 Plus is said to include all the features of the Laserjet Plus printer as well as increased paper-handling capabilities for multiuser computer environments. The Laserjet 500 Plus offers two 250-sheet paper input bins and an output bin that can hold up to 250 sheets.

According to the vendor, the dual paper bin allows users to print documents on more than one size or type of paper, without changing the paper manually, by remotely selecting the correct paper bin from the CPU's keyboard.

The printer offers mixed text and graphics, print speeds up to eight pages per min, 55db operation, a print resolution of 300 by 300 dots/in., downloadable fonts and electronic forms. It also offers several keyboard-controllable, paper-handling options.

The Laserjet 500 Plus printer reportedly delivers document pages face down. It



The HP Laserjet 500 Plus printer allows bin selection from the keyboard.

also offers job offset, a feature that separates documents when they enter the output bin.

The Laserjet 500 Plus offers dual RS-232C/RS-422 and Centronics Data Computer Corp. parallel or serial interface ports. It costs \$4,995.

TI enhances Business-Pro system

Texas Instruments, Inc. of Austin, Texas, has announced that several new options for its Business System 1000 series are also available for multiuser configurations of its Business-Pro computer.

Among the enhancements to the Business-Pro system are a 140M-byte disk drive, the 924 VDT and the Cobol System V programming language.

According to the vendor, other features include a programmer development shell, an enhanced indexed-sequential access method file routine as well as a conversion utility set for transferring current Business System DX10 or DNOS files to the Microsoft Corp. Xenix System V operating system.

The Business-Pro computer has an IBM-compatible, 16-bit Intel Corp. 80286 CPU

with eight full-size and six half-size expansion slots and a maximum memory capacity of 16M bytes, according to Texas Instruments.

An entry-level configuration for the Business-Pro Xenix system consists of a system unit, 1M byte of random-access memory (RAM), a 1.2M-byte floppy disk drive, a 40M-byte Winchester disk, a 60M-byte tape backup, a monochrome monitor and the Xenix System V operating system, the vendor said.

It is priced at \$9,335. An expanded Xenix system includes 1.5M bytes of RAM, a 1.2M-byte floppy disk, a 72M-byte Winchester disk, a 60M-byte tape backup, a color monitor and the Xenix System V operating system. It costs \$12,190.

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If you've been involved in data processing for any length of time, you already know more than enough about the dangers of piecemeal "quick fixes." You don't have to be sold on the value of integrated tools that meet a full range of organizational needs through a common language and shared procedures.

But while many vendors preach integration, few practice it on the scale of Software AG. From our core products, ADABAS and NATURAL, we have created an entire universe of software products that simultaneously meet the needs of everyone from MIS professionals to end users with no computer experience.

We're also integrated in another way—geographically. As more and more organizations seek to coordinate resources and data on a worldwide basis, they need a caliber of support that is consistent worldwide. Software AG's reach is unique among independent software vendors—with products installed in 52 countries.

Fourth-generation technology: Who needs it? Who's got it?

A lot of vendors have expended a lot of hot air on the subject of fourth generation languages. And we'd be the last to deny that a well-designed "4GL" can be a phenomenal productivity tool—as much as 10 to 20 times more productive than COBOL, for instance.

But if you want to see per-

formance in a fourth-generation system, not just a language, the list of contenders narrows way down. We suggest starting with any of the 400,000 programmers who've been using NATURAL since 1978.

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It's one thing for a vendor to be proud of its products. It's another for an entire industry to share in that high regard.

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Systems software

VM Software, Inc. has announced VMaccount Release 3 for the IBM VM environment.

New features include full screen file editing, summarization of data and reporting capabilities and extensions to the on-line query facility.

VMaccount is available as a stand-alone or component of VM Software's VMcenter.

VMaccount Release 3 costs \$12,500.

VM Software, Suite 365, 3070 Chain Bridge Road, Vienna, Va. 22180.

Quintus Computer Systems, Inc. has ported its Prolog development system to the IBM RT Personal Computer.

Prolog is said to offer users a complete development environment that includes a full screen text editor, comprehensive debugger, style checker and foreign language interface.

According to the vendor, Prolog on the RT PC is suited for the development of logic-based applications such as expert systems, diagnostic tools and natural language interfaces.

Quintus Prolog on the IBM RT PC costs approximately \$8,000.

Quintus Computer Systems, 2345 Yale St., Palo Alto, Calif. 96306.

Honeywell, Inc. has added the Production Cost Accounting module to its Honeywell Manufacturing System for its large-scale computer systems.

The module provides assistance in accumulating and comparing actual costs to frozen and current standard cost. It assists in tracking inventory dollars and scrap costs through the production process. Also included are capabilities to create and maintain inventory account history and to revalue inventories as standards change.

The Honeywell Manufacturing System is a manufacturing management system offering integrated inventory and production control. The initial fee for the Production Cost Accounting module is \$16,200. It is leased per month for \$675.

Honeywell, 2222 W. Peoria Ave., Phoenix, Ariz. 85029.

Lisp Machine, Inc. has introduced Objectlisp, an object-oriented programming paradigm.

Objectlisp is said to feature portability, software de-

velopment with full advantage of the Zetalisp environment, implementation in Commonlisp and public domain status.

Objectlisp is said to be portable to systems supporting Commonlisp. It is available on Lambda, the Lisp Machine artificial intelligence workstation. It runs on other systems including Sun Microsystems, Inc.'s Sun-2 and Sun-3 running Sun Common Lisp.

The software is available on a 1/4-in. magnetic tape

packaged with a user guide and source code. The shipping, handling and media charge is \$195.

Lisp Machine, Building #4, 6 Technology Drive, Andover, Mass. 01810.

Uccel Express Software has released Fastdaad 4.1, an enhanced version of its performance measurement, tuning and analysis tool.

Fastdaad 4.1 is said to fa-

cilitate string balancing activities and to assist data center management in making effective use of cache controller units. The Cross Volume Analysis feature was enhanced to allow users to reduce I/O path contention and support whole volume migration applications. The added Cache Control Unit Analysis feature illustrates how effectively a cache is being used.

Fastdaad 4.1 costs \$9,900 for a single CPU. A site li-

cense costs \$10,900. It supports all MVS releases.

Uccel Express Software, P.O. Box 1169, 360 Herndon Pkwy., Herndon, Va. 22070.

Corporate Computer Systems, Inc. has announced Smash, a security system designed for Hewlett-Packard Co.'s HP 3000.

Smash is said to provide a security package and a menu processor. User access to the

Remember When the Robot Was



NEW PRODUCTS/SOFTWARE & SERVICES

computer functions is controlled by identification and password, and Smash requires regular changes of passwords. It includes a time-out facility to secure terminals left unattended after password entry and provides detailed logging of program use by device and user.

Smash relocatable binary license costs \$2,800. Smash right to copy costs \$1,400, and Smash customer support costs \$625 per year.

Corporate Computer Sys-

tems, 33 West Main St., Holmdel, N.J. 07733.

The Cambridge Systems Group, Inc. has introduced Release 3.0.2 of ASME software, an automated storage management system said to maximize use of DASD resources in IBM MVS, MVS/XA and VSI environments.

The release is said to feature expanded Interactive System Productivity Facility

support, VSAM support and enhancements to ASME recovery facilities.

It also offers support for the IBM 3380E dual-density disk and 3480 magnetic cartridge tape subsystems.

The upgrade to Release 3.0.2 is available at no charge to current users of ASME. Release 3.0.2 is available to new users for \$18,500.

The Cambridge Systems Group, 1530 Lawrence Expressway, Santa Clara, Calif. 95051.

Pilot Systems, Inc. has announced **Pilot Manufacturing Software Version 10.A** for Unix-based systems.

The software features menu-selectable Help screens, an extended credit system, a customer service inquiry capability during sales order entry and duplicate customer purchase order check. Version 10.A allows matrix, contract and product class pricing schemes, provides graphics summary displays and in-

cludes a corporate logo print.

Other customer reports provide vendor/part performance reports, mail list and prospect analysis and 12-period general ledger operation with report formatter.

Individual modules are priced from \$3,000. The complete system starts at \$30,000.

Pilot Systems, Suite 111, 125 Windsor Drive, Oak Brook, Ill. 60521.

Application packages

Perregrine Systems, Inc. has released **Version 3** of its data center management software product, **PNMS III**.

The release features a financial management application, an enhanced format manager, increased printing capabilities and message distribution to the problem, inventory/configuration and change management applications.

The PNMS III system is implemented with Perregrine Four, the fourth-generation application software for use on the IBM 370, 3000 or 4300 systems using MVS/VTAM, and for several mini and supermicrocomputers using Unix.

Prices for PNMS III range from \$5,000 to \$35,000.

Perregrine Systems, Building C, 16580 Rockfield Blvd., Irvine, Calif. 92714.

Information & Computing Services, Inc. has announced **Mail Master**, a mailing list manager for the IBM System/36.

Mail Master features alpha name search capability, five user-defined fields, the ability to maintain confidential notes, an interface to IBM Displaywriter/36 and multiple sort and selection features.

The one-time license fee of \$495 includes source code and user and technical documentation.

Information & Computing Services, Suite 220, 815 S. Main St., Jacksonville, Fla. 32207.

McDonnell Douglas Architectural, Engineering & Construction Systems Co. has added the **Civil Designer** and **External Program Interface** to its **Graphics Decision**

Continued on page 80

Nothing More Than a Dumb Waiter.

To say the very least, what started as nothing more than a futuristic novelty act, tomorrow's conversation piece, is now a given, an important, productive piece of standard operating equipment for factory automation.

The robot has arrived.

Keeping in mind the robot's evolution into an accepted fact of manufacturing life, we'd like to introduce you to a service that will inevitably become a standard in maintaining complex voice and data communications systems.

Introducing Communications Service Assurance from PacTel Spectrum Services.

A service some said was simply too good to be true.

A service every MIS director and telecommunications manager wanted but refused to believe in.

"Wish list thinking," they said. And wish list thinking is what we're offering.

Communications Service Assurance is a new concept, to be certain, and, just like the robot, will be met with its share of skepticism. That's OK. We're asking that you keep an open mind and read on.

Communications Service Assurance represents a single source for problem detection, diagnosis and preventive monitoring, as well as expediting restoration of your corporate communications. It helps with expansion and alteration and gives you customized services.

Communications Service Assurance packages the comprehensive solution for improving your system performance. You're

able to concentrate on strategic MIS responsibilities instead of playing catch-up and reacting to the hassle, headaches and hang-ups of day-to-day problems plaguing your system.

Communications Service Assurance can be applied to any equipment, any protocols, at any site.

It incorporates diagnostic hardware and software.

It delivers teams of experienced test engineers from diversified backgrounds.

It accesses a unique system inventory data base.

It involves an ongoing industry relations program.

Remember, this is a service. We sell no hardware, lease no lines and repair no equipment.

What we do sell is increased reliability, productivity, bottom line cost-effectiveness and any level of expertise available 24 hours a day (we never close).

We're a wish that's a reality. We're a service that will become as important and accepted as the robot.

Rest assured, **Communications Service Assurance** has arrived.

For further information, please call 800-446-4321. Or you can write directly, **PacTel Spectrum Services**, 100 Pringle Avenue, Suite 750, Walnut Creek, CA 94596, attention N. Floyd, Marketing Director.

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michaels.ross & co., Inc.
800 West Roosevelt Road
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Olean, N.Y. 13827
(315) 790-8040



Naturally sophisticated forms are usually based on simple ideas. Ideas that seem obvious after the fact. The kind of ideas that defy conventional thinking, or lead to maximum performance from minimum means. Ideas like combining the technology of multiple 32-bit micro-processors with mainframe architecture and concurrent on-demand operating system capability.

That kind of thinking led to a very fast, very powerful and very affordable super micro-computer.

The MPS020-2.*

It's from Icon and Sanyo.*

Icon is a market-driven, free thinking bunch of American engineering entrepreneurs, and Sanyo is a six billion dollar industrial giant from Japan. This combination gives you market sensitive engineering and service from us, plus rigorous testing, inspection and quality conscious manufacturing from Sanyo.

It's the best of both worlds.

Our natural division of labor saves your time and power. Our Central Processor isn't burdened with file management responsibilities. It manages user programs, terminal activities and executes its segment of the operating system. In parallel with the CPU is the Floating Point Co-Processor. It crunches the big numbers.

Meanwhile, the Disk Cache Processor is lining up information needed for high speed operation. This process of disk caching overcomes slow disk performance and contributes to a continuous operation with zero wait states.

We call this division of labor MultiMicro/Mainframe™ architecture. It's a sweet combination that gives you unmatched price/performance.

We've brought together what most keep separate. Operating systems. Our concurrent on-demand operating system means you don't have to base your applications software future on a single programming decision.

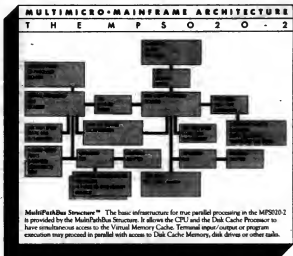
If what you have, or what you need in the way of software, runs on Unix or MS-DOS (other operating systems will soon be available), it will run on the MPS020-2.* Wouldn't this simplify your life?

Don't get stung by a system that gives you less for more.

Our approach is different. More for less. More users, more power, less money. Power enough for 32 users, each with a gigabyte of virtual memory. This is coming from two concurrent processors, both rated well over 1.5 MIPS. For this, you'll have to store away far less than you'd expect.

Icon may change the way you think of the future.

If so, give us a buzz. 801 225-6888.



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NEW PRODUCTS/SOFTWARE & SERVICES

Continued from page 77

Systems family of software products. Civil Designer addresses the decision-making process of civil design from concept to documentation, the vendor said.

Through screen and tablet menus, designs are created and edited for design by Moss Systems, Ltd.'s Moss.

The External Program Interface allows a company's software to access and modify the Graphics Design System data base. The interface supports user programs that are external to McDonnell Douglas' computer-aided design system and written in Fortran, Pascal or C, according to the company.

Civil Designer is priced as part of the Moss software package, which starts at \$35,000.

The External Program Interface starts at \$5,000. McDonnell Douglas, P.O. Box 516, St. Louis, Mo. 63166.

Kemp Software Systems has announced Masterpro/3000, an operations scheduler/manager for the Hewlett-Packard Co. HP 3000.

Masterpro/3000 is said to allow production scheduling by day, week, month, year and business day. It also allows scheduling by time, device availability and relationship to other jobs.

Masterpro/3000 will calculate, format and substitute correct dates into job entry initiatives.

Schedules can be edited or deleted,

even as a schedule is being processed, the vendor said.

Masterpro/3000 is priced at \$3,495 for the first installation, Kemp Software said.

Kemp Software Systems, #10 6040 W. Carlos Ave., Hollywood, Calif. 90028.

Corporate Computer Systems, Inc. has introduced Cword/1000, a soft key driven word processor for the Hewlett-Packard Co. HP 1000.

Cword/1000 is said to feature the functions of a true word processor plus the ability to run in formatter mode. It offers three interchangeable modes of operation, according to Corporate Computer.

All features are said to be covered by three levels of user-adjustable protection prompts.

Cword/1000 interfaces to most printers including the HP Laserjet and Laserjet Plus.

It is said to include the features needed to run other HP 1000 programs such as the Jspal spelling checker.

Cword/1000 relocatable binary license costs \$2,000, Corporate Computer said.

Corporate Computer Systems, 33 West Main St., Holmdel, N.J. 07733.

Boeing Computer Services Co. has announced the Boeing Proposal Pricing System, a system designed to help government contractors respond

quickly and competitively to the cost proposal portion of a government request for proposals.

The system structures the bid process in accordance with Federal Acquisition Regulations used by the U.S. Department of Defense, Department of Energy, National Aeronautics and Space Administration and other federal agencies. It is menu driven and supports the building of indented Work Breakdown Structures that satisfy government accountability requirements.

The Proposal Pricing System operates on IBM 4300 and 3090, 3080 and 3090 series computers using the MVS/TSO and VM/CMS operating systems. It costs \$60,000.

Boeing Computer Services, 7980 Boeing Court, Vienna, Va. 22180.

Soft Pro Systems has announced the Computer Aided Corporate Telephone Directory System for the Wang Laboratories, Inc. VS computer.

The system was designed to eliminate relational coding for producing organizational listings in preparing or updating a telephone directory. It features automatic search/modify same-name listing in multiple occurrences, the ability to move individual names or groups of names, global modification and on-line inquiry by partial name and telephone number.

The system is priced from \$10,000 to \$25,000 per CPU.

Soft Pro Systems, 3718 MacDonal Ave., Richmond, Calif. 94805.

Intercon Associates, Inc. has announced Office/Publisher, a publishing software package that allows Data General Corp. Comprehensive Electronic Office (CEO) word processing users to produce typeset output.

Office/Publisher is said to be integrated with CEO. It accepts formatted CEO documents and reformats, composes, paginates and outputs automatically to a laser printer or phototypesetter. It features proportional spacing, justification, typography, hyphenation, multiple columns, auto page layout and headers.

Office/Publisher supports the Eclipse MV family of computers. It is priced from \$3,000.

Intercon Associates, 1580 Emerson St., Rochester, N.Y. 14606.

UTILITIES

Redmond Technologies has announced an enhanced version of its Line Monitor/38, a utility package designed to correct IBM System/38 communications line failures.

Line Monitor/38 is said to monitor communications lines, fix routine communications line problems and create a log of all communications line problems. Enhancements include improved line-checking performance, optional user exit for initiating a job upon line failure and an option to purge data from the line failure log automatically.

Line Monitor/38 costs \$995.

Redmond Technologies, 1024 Wilden Drive, Lake Ridge Park, Ashland, Va. 23006.

GARTNER GROUP, INC.

A LETTER FROM GIDEON GARTNER

I invite you to attend Gartner Group's special open conference on Artificial Intelligence, May 5-6 at the Sheraton Center in Stamford, Connecticut.

If you know about AI, you'll want to mingle with your peers. If you ought to know more about AI, then this is a special opportunity to listen and talk to the most impressive group of AI experts ever assembled in one room. A list of speakers is included below.

Highlights include: an IBM presentation on its commitment to AI analysis and live demonstrations of current projects among large users. Debates on the positions and strategies of major LISP engine vendors, and on current trends in manufacturing and delivery architectures in AI.

designing and investment opportunities in AI.

To register, or for more information on content and prices, just call Aileen Pearce at (203) 967-6757.

Sincerely yours,

Gideon I. Gartner

P.S. If you cannot make this meeting but have an interest in any of the other exclusive meetings listed below, ask Aileen for a copy of the agenda.

GARTNER GROUP 1986 CONFERENCES

Personal Computing Conference
May 12-13, 1986, Nashville
Software Industry Conference
June 9-11, 1986, Monterey
Small Systems Conference
June 14-15, 1986, Nashville
IBM Future Conference
June 19-20, 1986, Las Vegas
Gartner Group Scenario Conference
September 5-17, 1986, Atlanta

SPEAKERS

William H. Bell, President, EG & G; Katherine Brannstrom, President, Brannstrom Assoc.; Sheldon Braker, President, Syntronics; Joseph Braggs, Senior Vice President, The Travelers; Randall Davis, Associate Professor, MIT; Rainer Dwyer, President, EDWARDS Holdings; Bob Stalder, President, Lucid; Paul Harman, Editor/Expert Systems Strategist; Larry Hertz, President, Artificial Intelligence Corp.; Bruce Johnson, Partner, Arthur Andersen & Co.; Alex Jacobson, President, Insurance Corporation; Tom Kallala, Executive VP, Intel Corp.; Peter Lauen, Program Director, Software Management Strategies; Service Group; John Lavelle, Manager, R&D of AI, Martin Marietta Lab; Thomas Lane, President, Productivity Product International, Inc.; Fred Leland, President, Applied Expert Systems Inc.; Gary Mendenhall, General Manager, AI Systems/Service AS; Vera Peltzer, President, Syntronics; Barry Peltzer, President, AON; Herb Peltzer, Group Director, Information Systems and Storage Group; John Smith, Genl. Partner, Asset Management Co.

REACH ARGENTINA'S GROWING COMPUTER MARKET.

Argentina is the second largest computer market in South America and the third largest in Latin America. In 1983, there were 24,200 computers installed, valued at \$421 million (U.S.).

Computerworld Argentina is the publication Argentine computer professionals rely on for all the latest local and international developments in hardware, software, services and office automation. Published twice a month, and modeled after its sister publication in the U.S., Computerworld, Computerworld Argentina circulates to more than 6,000 MIS/DP professionals throughout Argentina.

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NEW PRODUCTS/SOFTWARE & SERVICES

Valid Logic Systems, Inc. has introduced Validflat, a software package said to translate hierarchical designs into flat designs.

Validflat is a computer-aided engineering tool. It runs on Valid's Scald system and Scaldstar workstations.

The structured computer-aided logic design methodology allows the creation of original schematics with full hierarchy, replication of components and any other tools available. When the design is complete and documentation describing the physical design is required, the user runs Validflat to create all necessary bottom-level schematics with a pin-to-pin mapping to the physical design and full back annotation.

Validflat costs \$10,000. Valid Logic Systems, 2820 Orchard Pkwy., San Jose, Calif. 95134.

PFK Systems, Inc. has announced the Load Module Directory Facility, a mainframe productivity tool for MVS and VM users.

The module provides an ISPF dialog framework within which load module analysis and reporting may be conducted interactively. It allows users to monitor program change activity, record the date and time a load module is created and compare versions of a program within different libraries.

The Load Module Directory Facility costs \$525.

PFK Systems, 304 Mulberry St., New York, N.Y. 10012.

Decision Graphics, Inc. has announced Celdoc, a cell documentation system for the Intergraph Corp. cell library.

Celdoc provides system and project managers with cell library maintenance and cell library documentation. Features include the ability to delete a cell or change a cell name within a cell library from an alphanumeric terminal and copy or move cells from one cell library to another.

Celdoc executes on the Intergraph and Digital Equipment Corp. PDP or VAX systems Version 8 or higher. It costs \$900.

Decision Graphics, Suite 1622, Executive Plaza, 555 Sparkman Drive, Huntsville, Ala. 35816.

Martin Marietta Data Systems has introduced an interface to IBM SQL/DS data bases for its Consensus on-line applications development system.

It is said to allow users to access SQL/DS data bases with applications developed from any combination of Consensus' three on-line components: UPRO, OPL4 and Cobol/XE. The Consensus SQL/DS interface costs \$6,000 for the DOS/CICS and CMS versions and \$9,000 for the OS/CICS version.

Martin Marietta, P.O. Box 2392, Princeton, N.J. 08540.

Nicoret Computer Graphics has enhanced its ZMD-Plot software to support invisible areas of blanking in graphics output.

ZMD-Plot is a file manager for IBM's Graphic Data Display Manager (GDMM) Release 4. It will convert

GDMM's Admprint files into the Graphics Machine's Admprint necessary to drive a Nicoret Zeta plotter.

Reverse clipping with ZMD-Plot allows the user to blank out certain portions of the graphic image and overlay a second image.

ZMD-Plot runs on IBM mainframes under VM, MVS, IMS and CICS. It supports IBM graphics products. It costs \$7,500.

Nicoret, P.O. Box 3020, Martinez, Calif. 94553.

Training software

Active Learning Systems, Inc. has announced The Personal Consultant series of interactive videodisk training courses.

The courses provide users with the ability to repeat sections of material, skip sections and ask for assistance at any point in the program.

The Personal Consultant series consists of four courses for personal computer competency training. Each course consists of a videodisk program, computer diskettes and a reference handbook. They require an IBM Personal Computer, NCC Corp. PC 6, or compatible, a software-switchable monitor, a Pioneer videodisk player and interface cables.

The series sells for \$900 per course, not including hardware.

Active Learning Systems, P.O. Box 9, 5111-Hill Ave. S., Minneapolis, Minn. 55415.

Services

Information Sources, Inc. has announced the Business Software Directory, a book listing over 7,000 software packages and services.

The directory contains multiple indexes and is backed by an on-line data base. It includes information about accounting systems, computer-aided design, communications, cost estimating, data base management systems, distribution management, graphics, mailing lists, word processing and spreadsheets.

It costs \$175. Information Sources, 1807 Glenview Road, Glenview, Ill. 60025.

MICROCOMPUTERS

Systems

A. D. S. Imaging Systems has introduced the Model FIF-4000 image processor designed for use with personal computers.

Continued on page 82

SAS Institute Inc. Announces

Lattice C Compilers for Your IBM Mainframe

Two years ago...
SAS Institute launched an effort to develop a subset of the SAS Software System for the IBM Personal Computer. After several months we agreed that we had the programming techniques and know-how to develop the Lattice C compiler. We called it the quality, speed, and efficiency we needed.

One year ago...
Development had progressed so well that we were now able to announce the Lattice C compiler. SAS System on a PC, within 100,000, of using the language, create, and commands would be identical across all operating systems, we decided that all future versions of the SAS System—regardless of hardware—would be derived from the same source code written in C. That meant that we needed a C compiler for IBM 390 mainframes. And it had to be good, since all our software products would depend on it. So we approached Lattice, Inc. and asked if we could implement a version of the Lattice C compiler for IBM mainframes. With Lattice, Inc.'s agreement, development began and progressed rapidly.

Today...
Our efforts are complete—we have a first-class IBM 390 C compiler. And we are pleased to offer this compiler and tool to companies and individuals who are looking for a language that is more portable and compatible with IBM mainframes and PCs. We have fully implemented not only the language but also the supporting library and environment.

Features of the Lattice C compiler for the 390 include:

- Generation of standard object code. Secondary object code may be used to share the same code. Secondary is used to save space in modules on the 390, especially if you are concerned with the internal variables, but we did it.
- Optimization of the generated code. We have the 390 instruction set and the various 390 operating environments. We have the standard point of view of the language system, experience on our development.
- Generated code available in both 32-bit and 64-bit addressing modes. You can use generated code on the 390 in both 32-bit and 64-bit.
- Generated code available in both 32-bit and 64-bit addressing modes. You can use generated code on the 390 in both 32-bit and 64-bit.
- Complete library. We have implemented all the library routines described by the Language Reference Manual, and all the library

routines supported by Lattice (most operating systems dependent routines). We have the ability to handle both 32-bit and 64-bit addressing modes. We have the ability to handle both 32-bit and 64-bit addressing modes. We have the ability to handle both 32-bit and 64-bit addressing modes.

■ High performance. Many of the traditional string handling functions are available as built-in functions, generating highly efficient code, faster than function calls. You can use a string in place to last use MVS instructions rather than a function call and a loop.

In addition to mainframe address development, you can also use our new compiler to develop C software on your IBM mainframes. With our new program, you can compile Lattice C programs on your mainframe and generate object code ready to be downloaded to your PC. With the new compiler, we also offer PL/COMP and PL/COMP for Personal Software Associates Ltd. The Personal Software Associates Ltd. The Personal Software Associates Ltd. The Personal Software Associates Ltd.

Tomorrow...
We believe that the language offers the SAS System, the path to new portability and sustainability. And we believe that other companies and individuals who are looking for a language that is more portable and compatible with IBM mainframes and PCs. We have fully implemented not only the language but also the supporting library and environment.

C, the language of choice.

C supports structured programming with pointer control features for modularity, flexibility, and ease of extension. C is good for structures, with its elegant representation of structures and pointers. C is considered to provide coding. It is able to select for the size difference of data elements on different machines.

Continuous support.

At SAS Institute, we support all our products. We believe this is essential, we support them continuously. We get updates at all additional changes. We have a continuing commitment to make our compiler better and better. We have the ultimate guarantee—all our software products depend on it.

For more information...

Complete and call the support table. Should we get the development tool for your transaction.

SAS

SAS Institute Inc.
SAS Campus, Box 8000
Cary, NC 27513
Telephone (919) 689-8000 x 7000

I want to learn more about:

- ☐ The C compiler for MVS software development
- ☐ The C compiler for CMS software development
- ☐ The C compiler for PL/COMP and PL/COMP

Today...we're ready for tomorrow.

Please complete and attach your business card.

Name _____

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Mail to: SAS Institute Inc., Attn: C/C, SAS Campus, Box 8000, Cary, NC, USA.

27513-2000, Telephone (919) 689-8000, x 7000

07/4/86/25

NEW PRODUCTS/MICROCOMPUTERS

Continued from page 81.

The PIP-4000 is said to be suited to applications when it is necessary to monitor a variety of digitized video functions in real time. It is typically used with one or more television cameras, CRT display monitors and a personal computer. Video image switching units, electron microscopes and stroboscopic lighting units can be added.

The Model PIP-4000 is priced between \$16,000 and \$26,000.

A. D. S. Imaging Systems, 467 Hamilton Ave., Palo Alto, Calif. 94301.

Sonyo Business Systems Corp. has announced the **MBC-990** IBM Personal Computer AT-compatible desktop computer.

The **MBC-990** is Motorola, Inc. 80286 based. In a standard configuration, it offers a user-selectable clock of 6 MHz or 8 MHz with zero- or one-wait state. It has 512K bytes of random-access memory, a floppy-disk/hard-disk interface, one 1.2M-byte floppy disk drive and an 84-key keyboard. It comes with eight expansion slots, Microsoft Corp.'s MS-DOS 3.1 and its GW-Basic.

The **MBC-990** costs \$2,599. Sonyo, 61 Joseph St., Moonachie, N.J. 07074.

Software applications packages

Milwaukee Area Technical College (MATC) has ported its **MATC CAD** computer-aided drafting software to the IBM Personal Computer, Personal Computer XT and AT.

MATC CAD was designed to aid in the teaching of computer-aided drafting system operation, computer-aided drafting geometry creation and modification, autodimensioning, text and layering. Materials include a course syllabus, quizzes, examinations, laboratory exercises and an instructor's answer key.

MATC CAD for the IBM microcomputers costs \$500.

MATC, 1015 N. Sixth St., Milwaukee, Wis. 53203.

LM Software has introduced **Macspec**, a word processing package for the Apple Computer, Inc. Macintosh or Macintosh Plus.

Macspec was designed for the development of specifications, proposals and technical papers. It features

automatic section numbering, indentation, table of contents and the ability to generate a new table of contents and section numbers when needed.

Macspec is said to be compatible with the Apple Imagewriter and Laserwriter. It costs \$199.95.

LM Software, P.O. Box 93, Belmont, Calif. 94002.

Isoco has ported its **Disepila** graphics software to the 16-bit IBM Personal Computer AT.

Disepila is a Fortran subroutine library for generation of business and scientific graphics. For the AT, it comes on a floppy disk and will operate on a system equipped with 640K bytes of memory, a Winchester disk and an IBM Enhanced Graphics Adapter board with 128K bytes of memory. The Microsoft Corp. MS-DOS or IBM PC-DOS operating system is required.

A single copy costs \$990. Isoco, 10508 Sorrento Valley Road, San Diego, Calif. 92121.

National Instruments has added the **Macmillan Software Co. Aysp** package to its family of IEEE 488 applications software.

Aysp is a scientific software package for the IBM Personal Computer and compatibles. It offers analytical capabilities, statistics and graphics.

Aysp with General Purpose Interface Bus (GPB) support costs \$1,995. **Aysp** with the GPB-PCIIA costs \$2,290. The National Instruments GPB add-on for **Aysp** costs \$495. With the GPB-PCIIA, it costs \$695.

National Instruments, 12109 Technology Blvd., Austin, Texas, 78727.

Cadtrak Corp. has rolled out **Plant Trak**, a computer-aided design software package for the IBM Personal Computer XT and AT.

Plant Trak is a plant design program for the construction or retrofitting of plant components such as piping, plumbing and electrical wiring.

It requires Microsoft Corp.'s MS-DOS 2.1 or higher, an Intel Corp. 80287 math coprocessor, 640K bytes of internal memory, a 30M-byte hard disk, a 1.2M-byte floppy disk and an IBM graphics monitor.

Plant Trak costs \$17,500. **Cadtrak**, 823 Kifer Road, Sunnyvale, Calif. 94086.

Worthington Data Solutions has announced a **labeling program** said to print labels with a complete intermix of 10 character sizes and four bar codes.

Reportedly, the program prints up to 1.2-in.-high graphics and letters and operates on an IBM Personal Computer or compatible with Epson America, Inc., Okidata Corp. and IBM printers.

Separate disk data files in standard sequential text format can be used as data input to the program. More than one label can be printed across, depending on the width of the printer.

The program costs \$279. **Worthington Data Solutions**, 130 Crespi Court, Santa Cruz, Calif. 95060.



NEW PRODUCTS/MICROCOMPUTERS

Rand McNally & Co. has introduced Randmap, a statistical and demographic software package for personal computers.

Randmap is said to allow users to convert data into full color maps. According to the vendor, Randmap can create maps by state, county, three- and five-digit ZIP code areas, census tracts, metropolitan statistical areas and other standard geographies as well as user-defined boundaries. Users can label the maps and specify text and area colors.

Randmap costs \$995. Rand McNally, P.O. Box 7600, Chicago, Ill. 60680.

DHA Systems, Inc. has announced Fastpak Promail, designed for business mailers with lists in the 5,000- to 66,000-item range.

Promail features one- and four-wide Cheshire labels; last name, first name, company, salutation and telephone fields; and sorting by ZIP code, state or alphabetical order. It uses key sorting, provides ZIP counts for postage savings and allows for printed reference codes on labels.

Fastpak Promail is available in Digital Research, Inc.'s CP/M and Microsoft Corp. MS-DOS or IBM PC-DOS formats.

It costs \$159. DHA Systems, 832 Jury Court, San Jose, Calif. 95112.

Quixote Corp. has announced Rapidwriter, a high-speed entry system for personal computer users.

Rapidwriter is said to combine software with an improved standard keyboard. The user creates a dictionary by assigning mnemonics or abbreviations to frequently used text. The dictionary is accessed via a single key-stroke.

Rapidwriter works with the IBM Personal Computer or Personal Computer XT with a minimum of 256K bytes of random-access memory and IBM PC-DOS 2 or higher.

It costs \$695. Quixote, One E. Wacker Drive, Chicago, Ill. 60601.

Applied Data Research, Inc. (ADR) has announced Release 1.3 of the ADR/PC Adroit Training System, a software-based system for generating computer-based training materials on IBM Personal Computers.

The release features a vocabulary of 101 embedded commands said to provide analysis and manipulation techniques, according to the vendor.

Authors can embed commonly used commands in variables and use them in-

stead of rekeying the commands.

Students may be evaluated for exact or approximate responses.

Lessons branch within a screen, and graphics from other software may be imported into lessons.

Release 1.3 requires IBM PC-DOS 2 or higher, ADR said.

Prices start at \$4,500. ADR, CN-8, Route 206 & Orchard Road, Princeton, N.J. 08540.

Software languages

Texas Instruments, Inc. has announced the licensing of Cobol System V from Micro Focus for use on the TI Business-Pro professional computer under the Micro-soft Corp. Xenix System V operating system and on the 32-bit Business System 1560 under the TI System V operating system.

Cobol System V is said to provide a solution for both

Continued on page 86

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Continued from page 83

the Cobol programmer and the applications end user in a Unix or Xenix environment. The language can be used as a tool to deliver applications that run on mainframe systems. It offers the Animator feature, said to allow code to be debugged during program development.

Cobol System V will be available in the third quarter for \$4,500.

TI, P.O. Box 809063, H-848, Dallas, Texas 75380.

Software utilities

Systems Compatibility Corp. has introduced Doc-Exchange, said to allow IBM Personal Computer users to link their PCs running word processing software to dedicated Wang Laboratories, Inc. word processors.

Doc-Exchange is an internal multiprotocol board said to exchange fully editable documents. Doc-Exchange is also said to translate all function and format codes.

Doc-Exchange fits in any IBM PC expansion slot. It includes a single-channel communications board with an RS-232 interface, conversion software, null cable and documentation.

Doc-Exchange is priced at \$895.

Systems • Compatibility, Suite 1320, One E. Wacker Drive, Chicago, Ill. 60601.

Core Technology Corp. has released Quickey 2, a data entry system for the IBM Personal Computer, Personal Computer XT, AT and compatibles.

Quickey 2 allows the IBM PC keyboard to be set like an IBM 3741 keyboard, a standard PC keyboard or to be customized to suit the user.

Up to 12 format programs can be stored at once. Quickey 2 allows entry of records of up to 512 characters. It allows the user to move backward and forward without changing information. It provides production statistics by operation, job and batch. Data entry files can be copied as text files that may be transferred to host computers.

Quickey 2 costs \$495.

Core Technology, Suite 115, 7201 W. Saginaw, Lansing, Mich. 48917.

Specialized Systems Consultants, Inc. has announced an IBM Personal Computer AT/Microsoft Corp. Xenix System V port for Transcript, Adobe Systems, Inc.'s in-house publishing software.

Transcript allows Unix users to use troff to communicate with Adobe's Postscript printers, such as the Apple Computer, Inc. Laserwriter. Transcript supports a set of 13 typefaces and permits any point size from six to 36.

The cost for binary is \$495 and for source is \$1,795.

Specialized Systems Consultants, P.O. Box 55549, Seattle, Wash. 98155.

Telos Software Products has introduced Import/Export, a data exchange utility said to make its Business Plesision compatible with other Apple Computer, Inc. Macintosh programs.

The utility allows users to move data in and out of Business Plesision files in Document Interchange Format, Syk, ASCII and Software Development Facility standard formats.

Import/Export requires a 512K-byte Macintosh and an external or hard disk drive. It costs \$60. Registered users of Business Plesision may purchase it for \$25.

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NEW PRODUCTS/MICROCOMPUTERS

Software data base management systems

Market Statistics and Knowledge Access, Inc. has announced **Year Marketing Consultant**, a demographic and socioeconomic data retrieval and analysis system.

The product selects and ranks target markets according to variables such as population, households, income, retail sales, buying power, age, median age and median income. It is said to be compatible with Lotus Development Corp. 1-2-3. It requires a 256K-byte IBM Personal Computer or compatible.

Year Marketing Consultant costs \$950.

Market Statistics, 633 Third Ave., New York, N.Y. 10017.

Software Marketing Associates has announced **FY13000 Plus**, a text data base software program for the IBM Personal Computer and compatibles.

FY13000 Plus is said to manage text data bases of up to 65,000 free-form entries on multiple diskettes or a hard disk. It offers the choice of full-text cross-indexing and searching or assigned key words or phrases. Standard and simplified Boolean searching are provided, along with a truncation and a sounds-like feature.

FY13000 Plus costs \$395.
Software Marketing Associates, 4615 Bee Caves Road, Austin, Texas 78746.

Software enhancements

Portable Software has released **Version 3** of its **Porta-APL** software package for the Apple Computer, Inc. Macintosh.

Porta-APL is a full-featured interpreter for the standard APL programming language.

Porta-APL runs on the Macplus or a 512K-byte Macintosh with a single disk drive. It costs \$275. Current users can upgrade to Version 3 for \$25.

Portable Software, 60 Aberdeen Ave., Cambridge, Mass. 02138.

Information Technologies, Inc. has enhanced its **Linkup 3770 SNA**, **3770 BSC** and **3770 SNA** emulation products.

Enhancements include features such as foreground/background operations, enhanced multiple printing capabilities and up to 32 simultaneous sessions.

The Linkup products are available in a stand-alone coprocessor version for \$895 and in a standard adapter card hardware version for \$785.
Information Technologies, 7850 E. Evans Road, Scottsdale, Ariz. 85260.

Microsoft Corp. has released **The Benchmark Mail List Version 1.3**.

Mail List features full editing capabilities, rapid scanning of list entries, selective merging into two lists by criteria in any field, 14 available data fields, two 40-char. reference fields, deletion of unwanted fields and user-selectable print format.

Also included in the package is the **Benchmark Administrator** program, a master menu directory program.

As a stand-alone system, the **Benchmark Mail List** costs \$99. With

the **Benchmark Word Processor** and **Spelling Checker**, it costs \$199.

Microsoft, Suite 12, 9509 W. Frye Road, Chandler, Ariz. 85226.

T & W Systems, Inc. has released **Versacad Advanced Version 5**, said to support the Lotus/Intel/Microsoft Expanded Memory Standard.

Version 5 features the ability to save macros to any key or combination of keys and to disk for later playback. It offers programmable menus, the acceptance of equations as coordinates, a built-in computer-aided design programming language and cut-and-paste capabilities.

In addition, Version 5 features isometric visualization, multiple-line drawing with automatic corner clean-up, additional fill capabilities

and flexibility in coordinate input.

The product costs \$2,495.

T & W Systems, Suite 106, 7372 Prince Drive, Huntington Beach, Calif. 92647.

Palastr Software has announced **Version 3** of its **Word Processor**, including the **Palastr Speller** and **Mail-out**.

New features include column manipulation, horizontal and vertical line drawing, enhanced menus, and non-English language character support, built-in Microsoft Corp. MS-DOS commands and extensive pop-up menus.

Version 3 costs \$395.

Palastr Software, Suite 100, 12777 Jones Road, Houston, Texas 77070.

Group 1 Corp. has announced **Textbank Release 1.2**, an enhanced version of its text retrieval system for IBM-compatible personal computers.

Features of Release 1.2 include extended memory, support for additional storage devices, several extensions to the search language and user interface, as well as profiles of the most widely used **Dialog Information Services**, **Info**, **Dialog** and **BRS** Information Technologies **BRS** on-line data bases to make information automatically searchable when the information is downloaded.

It also provides full support for individual text files up to 20M bytes in size.

Textbank Release 1.2 is priced at \$895.

Group 1, 481 Carlisle Drive, Herndon, Va. 22070.

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NEW PRODUCTS/MICROCOMPUTERS

Viewlogic Systems, Inc. has announced additions and enhancements to Workview, its integrated personal computer-aided engineering workstation software.

Enhanced plotting and printing capabilities as well as user-selectable routing modes have been added, according to the vendor.

Other features include a general-purpose netlist, a new parts list, a cross-reference generator, a general-purpose back-annotation facility and a printed-circuit board layout interface utility.

According to the vendor, Workview is available in four versions that run on IBM Personal Computer hardware.

Prices range from \$3,500 to \$13,000.

Viewlogic, 33 Boston Post Road W., Marlboro, Mass. 01752.

Board level devices

Intelligent Software, Inc. has introduced The Software Engine, a range of 32-bit computer boards for the IBM Personal Computer.

The Software Engine works with a Motorola, Inc. 68020 microprocessor and has 1M byte of random-access memory for its operations. The product will reportedly increase processing power by more than 10 times.

Prices for The Software Engine start at \$1,999. Intelligent Software, P.O. Box 533, Old Greenwich, Conn. 06870.

Sigma Designs has announced the Sigma-EGA, a high-resolution graphics board said to offer IBM compatibility and Hercules Computer Tech-

nology Co. graphics support.

The board fits in a single slot slot. It features the IBM Enhanced Graphics Adapter, the IBM Color Graphics Adapter, the IBM Monochrome Display Adapter and the Hercules Graphics Adapter. It has 256K bytes of on-board standard memory.

Sigma-EGA is priced at \$595. Sigma Designs, 2023 O'Toole Ave., San Jose, Calif. 95131.

Auxiliary equipment

Dice Instruments, a Honeywell, Inc. subsidiary, has added a software graphics driver to its Lynx trackball line of cursor control devices.

The driver was reportedly designed for use with the Lynx trackball attached through the serial port on the IBM Personal Computer, Per-

sonal Computer XT, AT or compatibles with software that is set up to respond to inputs from a Microsoft Corp. mouse.

The Lynx trackball with the driver and a manual is priced at \$159. Dice Instruments, 102 E. Baker St., Costa Mesa, Calif. 92626.

COMMUNICATIONS

Controllers

Micom Systems, Inc. has announced that its Micom-Interlan subsidiary's N15010 Data Link Controller now allows IBM Personal Computers and compatibles to connect to Digital Equipment Corp. Decnet-DOS Ethernet local-area nets.

The N15010 is a board that plugs into the personal computer, providing 1000 bit/sec. data communications. Digital's Decnet-DOS software provides protocol support.

The product costs \$650. A model with an on-board transceiver costs \$650.

Micom Systems, P.O. Box 8100, 4100 Los Angeles Ave., Simi Valley, Calif. 93062.

Software

Universal Software has announced an entry-level version of its Universal-Link file transfer package for mainframes operating under DOS/VS or OS/MVS.

The product was designed for users needing to communicate with one remote terminal at a time using IBM's 2780/3780 bi-synchronous protocol. It can upload and download files to a single personal computer, micro, mini or remote job entry station over a switched or leased line.

Prices range from \$8,000 to \$40,000, depending on the system configuration.

Universal Software, Brookfield Office Park, Brookfield, Conn. 06804.

Profit Management Systems, Inc. has announced Handheld/3000, data communications software for the Hewlett-Packard Co. HP 3000 series minicomputer.

The software is said to link the HP 71 and the HP 94 handheld computers to the HP 3000. It supports a modified Xmodem error-control method of data transfer and includes HP 3000, HP 71 and HP 94 subroutines.

The product logs on, initiates the transfer, verifies the transfer and logs off with no user intervention.

Handheld/3000 costs \$2,500 for the first site and \$500 for each CPU.

Profit Management Systems, Suite 103, 9600 Koger Blvd., St. Petersburg, Fla. 33702.

Multiplexers/Modems

Telebyte Corp. has announced the Model 2496AA Accelerator.

The 2496AA is said to use Telebyte's data compression technology along with an integral V.22 bis modem to provide up to 9.6K bit/sec. asynchronous full-duplex dial-up data throughput. Host security is provided by a 17-digit master key.

The Model 2496AA features a Hayes Microcomputer Products, Inc. compatible AT dialer with telephone directory. It costs \$995.

Telebyte, 215 Oak St., Natick, Mass. 01760.

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NEW PRODUCTS/COMMUNICATIONS

Racal-Vadic has introduced the VA4492E dual-modem.

Sixteen VA4492E dual-modem boards may be installed in a Multiple Data Set (MDS) II chassis. Each board contains two V.22 bis, AT&T 212A- and 100-compatible modems that can be configured for the switched telephone network or two-wire leased lines. The modems provide full-duplex asynchronous and synchronous operation at 2,400 and 1,200 bit/sec. and asynchronous operation up to 300 bit/sec. The VA4492E costs \$1,595.

Racal Vadic, 1525 McCarthy Blvd., Milpitas, Calif. 95035.

Bytex Corp. has added T1 support to its Autoswitch line of electronic matrix switches.

The T1 port card is said to service two T1 ports at either 1.544M bit/sec. or 2.048M bit/sec. According to the vendor, it will enable Autoswitch users to patch and switch high-capacity, high-speed digital interfaces electronically, and it will provide a T1 multiplexer and T1 line splicing capability.

The T1 port set costs \$3,500.

Bytex, Southboro Office Park, 120 Turnpike Road, Southboro, Mass. 01772.

Equinox Systems, Inc. has announced the LDA-232, a palm-sized line driver said to allow any RS-232 computer terminal to transmit asynchronous data as far as three miles at speeds up to 19K bit/sec.

The unit is said to eliminate network signals and unpredictable data. It transmits full-duplex data and can be used in pairs to link terminals and computer ports. A single line driver can connect a remote terminal to an Equinox private branch exchange.

The unit costs \$70.

Equinox Systems, 12041 S.W. 144 St., Miami, Fla. 33186.

Local-area networks

Zenith Electronics Corp. has announced Z-LAN, a broadband local-area network system designed to link computer devices as far away as 30 miles.

Z-LAN allows devices to communicate via coaxial cable at 500K bit/sec. It can accommodate four separate networks on a single 6-MHz channel while data, video and voice services coexist on the same cable.

The system allows downloading of network configurations from a network manager.

In addition, it features built-in electronic mail, network management and diagnostic capabilities, according to the vendor.

The Z-LAN product family includes a dual-port Network Communications Unit for \$795, a Frequency Translator for \$9,900 and a local-area network bridge.

The four-channel bridge costs \$9,900.

Zenith Electronics, 1000 Milwaukee Ave., Glenview, Ill. 60025.

Cascade Graphics Systems has introduced the Cascade Speedlink local-area network, which is designed to support microcomputer-based computer-aided design (CAD) systems.

According to the vendor, the network can electronically transfer drawings as well as word processing and statistical data.

The Speedlink hardware and software are said to interconnect Cascade CAD systems, Apple Computer, Inc.

and IBM Personal Computer XT-compatible CAD systems, plotters and printers. They also are said to provide storage for up to 4,500 E-size drawings.

Speedlink is reportedly available with capacities ranging from 180M bytes to over 1G byte.

Prices start at \$28,000, Cascade vendor spokesmen said.

Cascade Graphics Systems, 16842 Von Karman Ave., Irvine, Calif. 92714.

Test equipment

Kentrox Industries, Inc. has announced the List 5 T-Serv T1 channel service unit.

The List 5 T-Serv is said to feature front-panel jacks to monitor or test T1 lines, a new front-panel LED that indicates reception of bipolar violations from the T1 network and an improved coding technique that prevents double-ended loop-back.

The basic T-Serv features

Continued on page 92

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*Outgoing 1985 mid-year terminal shipment update.



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Company

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City State Zip C-47.89

Mail to: Wyse Technology, Attention: Marcom Department,
3571 N. First Street, San Jose, California 95134.

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NEW PRODUCTS/COMMUNICATIONS

Continued from page 89
switch-selectable local or line power-
ing, a built-in loop-back generator
and an optional fault-locate filter.

List 5 T-Serv costs \$1,830.
Kentrex Industries, P.O. Box
10704, Portland, Ore. 97210.

Hall-Comsec, Inc. has introduced
the Wiretap, a miniature breakout
box for RS-232C displays and con-
figuration.

The device is said to provide full
breakout box capabilities for nine
RS-232C signals. It has nine red and
nine green LEDs, a nine-position DIP
switch, dual nine-position female
headers and multiple jumper wires.

The single-unit price for the Wire-
tap is \$37.50.

Hall-Comsec, 1024 Wakerobin
Lane, Fort Collins, Colo. 80626.

Auxiliary equipment

Precision Standard Time, Inc. has
announced the OEM-10, a precision
clock/time receiver.

The OEM-10 receives and decodes
the WWV and WWVH radio signals
broadcast by the National Bureau of
Standards (NBS). The signals are
synchronized to within 10 msec. of
the NBS atomic clock. The time infor-
mation includes days, hours, minutes
and seconds as well as tenths and
hundredths of seconds.

The receiver section has a five-
channel superheterodyne receiver
with an audio amplifier. The signal
processor has analog and digital fil-
ters. The data output section includes
an RS-232C interface and a transis-
tor-transistor logic-level serial inter-
face.

The OEM-10 costs \$450.
Precision Standard Time, 2586
Scott Blvd., Santa Clara, Calif. 95050.

SYSTEMS
& PERIPHERALS

Turnkey systems

Honeywell, Inc. has introduced
the packaged 6/22 Time and Atten-
dance and Factory Data Collection
Systems, the 6/45 Time and Atten-
dance System and the 6/45 Data
Collection System.

The systems provide stand-alone
solutions for factory data collection.

The 6/22 packages were designed
for use with Honeywell's DPS 6/22
minicomputer as the central proces-
sor.

The 6/45 versions use the DPS 6/
45 with the GC05 6 operating sys-
tem.

The 6/22 systems cost \$49,950
each. The 6/45 Time and Attendance
and Factory Data Collection cost
\$99,950 and \$94,950, respectively.

Honeywell, 2222 W. Peoria Ave.,
Phoenix, Ariz. 85029.

Processors

BTI Computer Systems has an-
nounced a memory module configu-
ration for the BTI 8000 series of 32-
bit multiprocessor systems.

The package combines the memory
controller with up to 8M bytes of
high-speed semiconductor memory
on one circuit board that plugs into
the system's resource module bus. Er-
ror checking and correction and bat-
tery backup are included. Memory
modules utilize 256K-byte chips and

are offered in 2M-, 4M- and 8M-byte
versions.

A module with a controller and 2M
bytes of memory is priced at \$16,000,
with alternate 4M-byte and 8M-byte
versions at an incremental cost of
\$3,000 per megabyte.

BTI, 870 W. Maude Ave., Sunny-
vale, Calif. 96066.

Terminals

Tektronix, Inc. has added the
CX4111 Computer Display Terminal
to its family of IBM 3270-at-
tached color graphics terminals.

The CX4111 is said to offer a 19-
in., 1,024- by 768-pixel display with
a virtual graphics space of four bil-
lion points. Sixteen colors can be dis-
played simultaneously from a palette
of 4,096 shades. It provides direct co-
axial attachment to IBM 3274 con-

trollers and features a 3270-style
keyboard and full screen, color 3270
alphanumeric.

The CX4111 costs \$13,950.
Tektronix, P.O. Box 500, Beaver-
ton, Ore. 97077.

Kimtron Corp. has introduced the
KT-22, a Digital Equipment Corp.
VT220-compatible terminal and the
KT-5 Integrated Calculator Data Ter-
minal.

The KT-22 comes with either a
green or amber display and a 14-in.
diagonal screen. It is capable of gen-
erating like character sets and video
attributes of the VT220.

The KT-5's on-line calculator is
said to be able to replace the stand-
ard desk calculator at workstation
locations.

The KT-22 costs \$509, and the KT-
5 costs \$485.

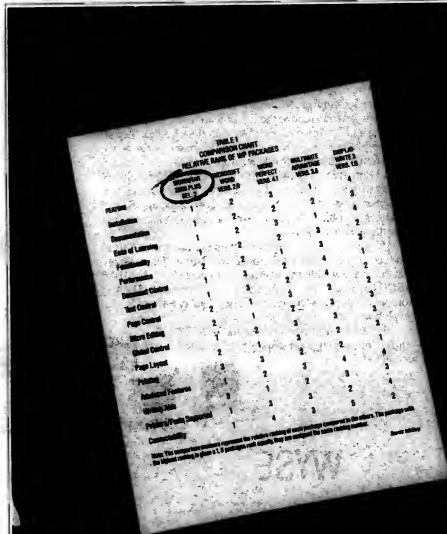
Kimtron, Building 160, 1705 Junc-
tion Court, San Jose, Calif. 95112.

Barcode Industries, Inc. has an-
nounced the Mindreader MR-230 se-
ries of CMOS-based bar code readers
with interfaces to IBM's 3270 Person-
al Computers and 3179, 3180, 3161
and 3163 terminals.

The MR-230 series enables users to
add bar code reading capability with-
out any hardware or software modifi-
cation. Signals from the bar code
reader emulate input from the key-
board. The MR-230 can be equipped
with any of three optical wand.

The MR-230 series costs \$630.

Barcode Industries, 17 Barstow
Road, Great Neck, N.Y. 11021.



NEW PRODUCTS/SYSTEMS & PERIPHERALS

Printers/plotters

Uchida of America Corp. has announced its OA Board.

The OA Board is said to be able to digitize and print out information written on or attached to it. According to the vendor, it can not only keep information for subsequent review or later verification but can also produce copies.

The board is available in two styles: Model 1800 and Model 1800, the vendor said.

Scanning speed is 10 sec./yard, and the scanner copies the Model 1800 in 10 sec. and the Model 1200 in 12 sec.

The price of Model 1200 is \$8,995, and the cost of Model 1800 is \$3,495, Uchida said.

Uchida of America, 2042-B Gladwick St., Compton, Calif. 90220.

Aedex Corp. has announced the Laserbar-608, an on-demand bar code printing system that utilizes laser technology.

The Laserbar-608 is said to produce bar code symbols on single sheets of paper, vinyl or mylar stock with plain or coated adhesive backing at a rate of 8 pages/min. The system interfaces to any computer system using Centronics Data Computer Corp. or Dataproducts Corp. parallel, RS-232C serial or coaxial interfaces.

The Laserbar-608 costs \$4,995 for 384K bytes of memory and \$5,895 with 1.2M bytes of memory.

Aedex, Suite C, 181 W. Orange-Thorpe, Placentia, Calif. 92670.

Components

Emulex Corp. has announced the DM08 dual-function disk controller

said to combine the benefits of enhanced small device interface (SDSI) and a floppy on a single dual-wide printed-circuit board.

The DM08 interfaces a Q-bus CPU with up to two SCSI 544-in. Winchester disk drives plus one or two floppy disk drives while implementing Digital Equipment Corp.'s Mass Storage Control Protocol. It works with DEC's Microvax I and II, Micro/PDP-11 and LSI-11 computers.

The DM08 costs \$1,649. Emulex, P.O. Box 6725, 3545 Harbor Blvd., Costa Mesa, Calif. 92626.

Bering Industries, Inc. has announced add-in memory boards for Hewlett-Packard Co. HP 3000 Series 30, 40, 42, 44, 46 and 58 computers.

The boards come in 1M-, 2M-, 3M-

and 4M-byte configurations and feature error-correcting memory, memory error logging and battery backup. All off-line and on-line diagnostics are supported, and 256K bytes of dynamic random-access memory types are used.

Prices for the 1M-, 2M-, 3M- and 4M-byte versions are \$5,000, \$9,000, \$13,900 and \$17,800, respectively.

Bering Industries, 1400 - Fulton Place, Fremont, Calif. 94538.

Target Systems, Inc. has introduced Boot-11, a dual-size module for use in Digital Equipment Corp.'s LSI-11 computers.

The module is used to boot devices such as MSCPC RD61/EX50 and RL01/RL02. According to the vendor, it may be used for booting a device or running a user program. It features a page control register that selects the area of memory in the erasable programmable read-only memory (EPROM) where the program resides. Two EPROMs are required, and they range in size from 4K bytes to 64K bytes. Boot-11 also has an area for removable bus termination.

Boot-11 is priced at \$250. Target Systems, 821 Southern St., Orange, Calif. 92665.

Decision Data Computer Corp. has announced Models 5436-01 and 5436-03 of its Memory Xtender/36 for the IBM System/36.

Both models are 256-K-byte configurations for the System/36 Models 5380 and 5382. They are compatible with IBM standard diagnostics.

According to the vendor, they allow users to run more jobs concurrently.

Model 5436-01 is for the System/36 Model 5380. It costs \$1,025. Model 5436-03 is for the System/36 Model 5382. It costs \$875.

Decision Data Computer, 400 Hershman Road, Hershman, Pa. 18044.

Monolithic Systems Corp. has introduced its MSC 3810A, a 1M-byte add-in memory module for Digital Equipment Corp.'s VAX-11/780 series computer systems.

The board uses four 64K-byte random-access memory elements, for a total of 256K bytes. According to the vendor, it is totally software and hardware compatible with DEC's MS 780 memory system. In addition, it contains socketed memory elements.

The MSC 3810A costs \$900. Monolithic Systems, 84 Inverness Circle E., Englewood, Colo. 80112.

Auxiliary equipment

Advance Products Co. has announced the Model CT-1000 mobile computer table.

The CT-1000 features two adjustable areas. The CRT shelf allows for an 8-in. height adjustment, and the work surface can be adjusted over a 5-in. height span.

The unit features 4-in. casters, two of which have locking toe brakes. Many accessories are available, including a locking storage compartment, a storage drawer and a safety bar.

The Model CT-1000 costs \$170. Advance Products, P.O. Box 2178, Wichita, Kan. 67201.

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NEWS

CALENDAR

WEEK OF APRIL 13

APRIL 13-17, LAS VEGAS — The 1986 National Interest Conference. Contact: Management Science America, Inc., 3445 Peachtree Road, N.E., Atlanta, Ga. 30326.

APRIL 14-16, MONTEKEY, CALIF. — Information System Support for Integrated Design and Manufacturing Processes Workshop. Contact: Michael J. Syde, Naval Postgraduate School, Department of Computer Science, Code 53, Monterey, Calif. 93943.

APRIL 14-17, ATLANTA — Telecommunications Systems in Government. Contact: Conference Manager, U.S. Professional Develop-

ment Institute, 1630 Elton Road, Silver Spring, Md. 20903.

APRIL 14-17, DENVER — Software Development for Government. Contact: Conference Manager, U.S. Professional Development Institute, 1630 Elton Road, Silver Spring, Md. 20903.

APRIL 14-17, PHOENIX — Twenty-Fourth International Magnetic Conference. Contact: J. U. Lemke, Conference Chairman, #1103, 2400 6th Ave., San

Diego, Calif. 92101.

APRIL 15-16, CHICAGO — Systems/84, 85 and 86 Users Show. Contact: Andrew Wahlers, The Product, 360 Merrimack St., Lawrence, Mass. 01843. Also being held May 28-29 in Washington, D.C.

APRIL 16, NEW ORLEANS — Costum Users' Exchange. Contact: NCR Centex, Inc., 2700 Snelling Avenue N., St. Paul, Minn. 55113.

APRIL 16-18, MADRID

— Personal Computers and Channels of Distribution in Europe Conference 1986. Contact: Inisco Contact, Suite B-203, 900 Pollard Road, Los Gatos, Calif. 95030.

APRIL 17-18, HOUSTON — Southwest Computer Measurement Group. Contact: Elton Robertson, Texas Utilities Services, Inc., 2001 Bryan Tower, Dallas, Texas 75201.

WEEK OF APRIL 20

APRIL 20-24, CHICAGO — Robots 10 Conference and Exposition. Contact: Robotics International of the Society of Manufacturing Engineers Public Relations, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121.

APRIL 20-25, NEW ORLEANS — Twenty-Fourth Annual Conference of the Association for Educational Data Systems. Contact: Association for Educational Data Systems — '86, P.O. Box 5688, Columbus, Ga. 31906.

APRIL 21, NEWTON, MASS. — The Computer Industry in Massachusetts: Future Directions. Contact: Deborah Dupes, Association for Women in Computing, Program Director, Suite 21, 66 Chiswick Road, Brookline, Mass. 02166.

APRIL 21-24, WASHINGTON, D.C. — Sixth International Conference on Decision Support Systems. Contact: Decision Support Systems — '86, 280 Westminster St., Providence, R.I. 02863.

APRIL 22-25, BOSTON — Conceptual/Logical Modeling and Design: An Integrated Approach to Data and Process Methodology. Contact: Bob Davoll, Charles River Development, 433 Beacon St., Boston, Mass. 02115.

APRIL 23-24, PALO ALTO, CALIF. — The California Computer Show. Contact: Dana Denardi, Suite 204, 289 S. San Antonio Road, Los Altos, Calif. 94022.

APRIL 23-25, DALLAS — Eighteenth International Management MIS Conference. Contact: Bruce Brämmer, Paper Industry Management Association, 2400 E. Oakton St., Arlington Heights, Ill. 60005.

APRIL 26, NEW YORK — Fourth Annual APL as a Tool of Thought. Contact: Devon McCormick, New York Special Interest Group on APL PDS, Suite 524, 660 Amsterdam Ave., New York, N.Y. 10025.

WEEK OF APRIL 27

APRIL 28-30, ALBUQUERQUE, N.M. — Integrated Fiber-Optic Technology Training. Contact: Linda Castle, Optoelectronic System Consultants, P.O. Box 35525, Albuquerque, N.M. 87176. Also being held June



NEWS

23-25 in Albuquerque.

APRIL 28-30, AVIGNON, FRANCE — Sixth International Workshop on Expert Systems and Their Applications. Contact: Jean-Claude Rault, Agence de l'Informatique, Tour Flat — Cedex 16, 92064 Paris — La Defense, France.

APRIL 28-MAY 2, RENO, NEV. — Use, Inc. Spring Computer Conference. Contact: Use, Inc., Box 401, Bladenburg, MD 20710.

MAY 1-2, TEMPE, ARIZ. — Logic Programming and its Applications in Expert Systems. Contact: Center for Professional Development, College of Engineering and Applied Sciences, Arizona State University, Tempe, AZ 85287.

WEEK OF MAY 4

MAY 5-7, GENEVA — Second World Congress of Production and Inventory Control. Contact: World Congress Secretariat-2F, 500 W. Anandale Road, Falls Church, Va. 22046.

MAY 5-7, WILLIAMSBURG, VA. — AM/FM International Regional Conference on Automated Mapping/Facilities Management. Contact: Barbara Emery, Contract Administrator, AM/FM International, No. 820, 8775 E. Orchard Road, Englewood, Colo. 80111.

WEEK OF MAY 11

MAY 11-14, NEW ORLEANS — Association for Systems Management Annual Conference. Contact: Richard B. McCaffrey, Association for Systems Management, 24687 Bagley Road, Cleveland, Ohio 44138.

WEEK OF MAY 18

MAY 19-21, HILTON HEAD, S.C. — Audit Managers Symposium VII. Contact: MIS Training Institute, Inc., 4 Brewster Road, Framingham, Mass. 01701.

MAY 19-21, SAN FRANCISCO — Hammer Forum West: Change and Continuity in End-User Computing. Contact: Hammer and Co., Hammer Forum West, Five Cambridge Center, Cambridge, Mass. 02142.

MAY 20-23, ORLANDO, FLA. — Techex '86 American Tech Annual and Fair for Technology Exchange. Contact: Anne E. Klenner, Dr. Dverkovitz & Associates, P.O. Box 1748, Ormond Beach, Fla. 32076.

WEEK OF MAY 25

MAY 29-30, SAN FRANCISCO — Unix In Focus. Contact: International Data Corp., Suite 201, 3350 West Bayshore Road, Palo Alto, Calif. 94303.

MAY 29-31, BLACKSBURG, VA. — Personal Computer Interfacing For Scientific Instrument Automation. Contact: Linda Leffel, Virginia Polytechnic Institute and State University, Blacksburg, Va. 24061.

WEEK OF JUNE 1

JUNE 2-5, DETROIT — Vision '86 — Applied Machine Vision Conference and Exposition. Contact: Vision '86 Public Relations, Machine Vision Association of the Society of Manufacturing Engineers, P.O. Box

930, Dearborn, Mich. 48121.

JUNE 2-5, NASSAU BAY, TEX. — International Symposium on Ada Programming Language Applications For Space Station Development. Contact: University of Houston — Clear Lake, 2700 Bay Area Blvd., Houston, Texas 77058.

JUNE 4-6, SAN DIEGO — 1986 National Educational Computing Conference. Contact: Susan M. Zilczynski, National Educational Computing Conference 1986, School of Education, University of San Diego, Alcalá Park, San Diego, Calif. 92110.

WEEK OF JUNE 8

JUNE 7, BEIJING — China-Delta '86: The International Trade Fair for Educational Equipment. Contact: Swiss Industries Fair, Secre-

tariat China Didacta '86, P.O. Box CH-4021, Basel, Switzerland.

JUNE 8-13, SAN DIEGO — MUMPS Users' Group 15th Annual Meeting. Contact: MUMPS Users' Group, Suite 510, 4321 Hartwick Road, College Park, Md. 20740.

JUNE 10-13, ATLANTA — Summer 1986 Unix Conference and Exhibition. Contact: The Unix Association Conference Office, P.O. Box 385, Sunset Beach, Calif. 90742.

WEEK OF JUNE 15

JUNE 16-20, CAMBRIDGE, MASS. — Managing Information Technology: New Responsibilities in a Changing Environment. Contact: Center for Information Systems Research, Sloan School of Management, MIT, E40-183, 77 Massachusetts

setts Ave., Cambridge, Mass. 02139. JUNE 17-19, ATLANTIC CITY — Plus-Tech '86. Contact: Deis Associates, P.O. Box 338, Delta Marketing Communications Center, Whitehouse, N.J. 08888.

WEEK OF JUNE 22

JUNE 22-27, PHILADELPHIA — Management Information Systems For Strategic Advantage. Contact: The Registrar, 500 Vance Hall, Office of Executive Education, The Wharton School of the University of Pennsylvania, Philadelphia, Pa. 19104.

JUNE 23-27, AMSTERDAM — Fourth Annual European Fiber-Optic Communications and Local-Area Networks Exposition. Contact: Information Gatekeepers, 214 Harvard Ave., Boston, Mass. 02134.

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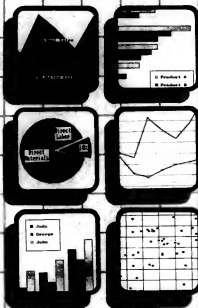
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COMPUTER INDUSTRY

Section begins on page 128

Morris Decision Systems prospers in N.Y. PC retail mart

Dealer targets sales to professionals, managers in corporate accounts

By Eric Bender

NEW YORK — As long as there is an oversupply of both retail dealers and microcomputers, corporations can negotiate to get IBM's volume purchasing prices along with dealer's terms and conditions, which strips away the margin for the dealer's expensive additional services. But in the past six years, Morris Decision Systems, Inc. has dodged this kind of bullet and become the largest business-only dealer of personal computers in the New York metropolitan area.

"It's the large-account customer who has gotten the best deal in the PC industry, and it's come at the cost of the dealer channel," declares Anthony Morris, president of Morris Decision Systems. "That's because of the immaturity of the dealer channel and the immaturity of IBM."

Unlike many retailers who sought to capitalize on the early boom in home computers, Morris' company since its inception has targeted managers and professionals within corporate accounts. And although it runs several storefront operations, it

describes itself not as a retailer but as a combination of dealer, network systems integrator and professional services firm. Now employing about 170, the firm has installed more than 16,000 workstations, Morris says. Sitting in his office a block from Wall Street, Morris, 39, outlines the strategies that make his firm a survivor in a field where dozens of resellers have bloomed and vanished.

Prime among these strategies is his own user's perspective, he suggests. "I've walked into the business not enamored of the technology itself, major elements of which I don't understand," he says.

Morris put up the original funds for Morris Decision Systems himself. "Then it was the bank and retained earnings — and our trade creditors," he says. "We started with Apple Computer, Inc. because that was the only thing that would support managers and professionals. In 1981 and early 1982, sales really took off, and we were one of Apple's largest dealers."

The firm became an authorized IBM dealer in November 1982, and by mid-1983, as the ill-fated Apple III struggled for corporate acceptance, IBM accounted for more than half of Morris' sales.

"Lately, we haven't figured out how to make money with Apple," Morris says. "I like them. They always seem just about to go in the right direction. But in larger accounts, nobody's buying them."

Morris says another key to success was his firm's early emphasis on local-area networks — it installed its first in 1981. The company has installed more than 260 nets, and network components

— not counting workstations and associated equipment — now make up about 9% of overall sales.

The reseller's sales rose from \$900,000 in 1981 to \$2.7 million in 1982, \$10 million in 1983 and \$17 million in 1984. In November 1985, the firm merged with Westport, Conn.-based Computerworks, Inc. another independent dealer organization, and picked up some venture

capital funds at the same time. Morris Decision Systems achieved 1986 sales of about \$24 million, while Computerworks added another \$18 million to \$19 million, Morris estimates.

Joining forces assured better purchasing discounts — a critical concern, Morris acknowledges. "If you look at the workstation business, it is an industrial distribution business, no buying power counts," he says. "For both Morris and Computerworks, the merger was just in time because we were both companies that either had to get bigger by a material amount or smaller. And getting smaller is no fun."

Today, the combined company sells four main products and services: workstations, advanced systems (primarily networks), maintenance and consulting/development services. "We have no nose-to-nose competitors across every line of business," Morris says.

Morris says he expects economies of scale from the merger to boost profitability. He is also very confident of a handsome payoff on some recent large investments, including centralized data management based on a Hewlett-Packard Co. mini, an operations center "configured to serve workstations out into the marketplace" and network expertise.

See MORRIS page 101



Anthony Morris, president of Morris Decision Systems

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COMPUTER INDUSTRY

Migent Software acquires Ability from defunct Xanaro

Software package gets sizable price cut

By Douglas Murray

ENCLINE VILLAGE, Nev. — The long and twisted saga of now-defunct Xanaro Technologies, Inc. and its Ability integrated microcomputer software package finally came to an end recently with the purchase of the Ability source code by Migent Software Corp., headed by former Xanaro Vice-President of Sales Carl Gritzmaker.

With Ability in new hands, the product's outlook may be brighter. Following a trend established by mi-

crocomputer software upstarts such as Borland International, Inc. and Paperback Software International, Migent immediately dropped the suggested retail price of the highly praised Ability from \$495 to \$99.95.

Migent won the rights to Ability through a sealed competitive bid ordered by the Ontario Supreme Court after Toronto-based Xanaro was forced into receivership, the Canadian form of bankruptcy, by its creditors earlier this year.

Xanaro ran aground after its bold

marketing campaigns, including television advertising, failed to spark enough sales to offset the firm's debt, which escalated into the millions [CW, Jan. 20]. According to Migent officials, Xanaro's debt reached \$8.4 million (Canadian).

Despite denials from Borland International executives, industry rumors persisted that Borland was interested in Ability and, like Migent, was planning to slash the price of Ability to less than \$100.

Migent won the rights to Ability with a bid of \$345,000 in Canadian

currency, an additional \$250,000 to be paid within nine months and a 3% royalty on sales of Ability. Under a joint agreement, Noramco Capital Corp. of Vancouver, B.C., funded the acquisition of Ability by Migent. Specific terms of the joint agreement have not yet been determined.

Migent is currently handling all Ability support calls and is taking orders for immediate shipment of Ability 1.0 A. A new version of Ability will be available in three to four months. In addition to Ability, Migent markets \$395 Enrich microcomputer data base software and a \$159.95, 1,200 bit/sec. miniaturized modem that includes a communications software package.

99
With Ability in new hands, the product's outlook may be brighter.

Industry pushes for telecom law

From page 126

quired to impose restrictions on the access of foreign suppliers to the U.S. telecommunications market.

"Partners have too much to lose"

"In the final analysis, our trading partners have too much to lose that it, access to our market — to adhere to their restrictive policies in the face of the certainty of presidential action," according to Rockwell International's Culp.

Representing the Electronic Industries Association's Information and Telecommunications Technologies Group, Culp testified in support of the bill.

Culp urged Congress to pass telecommunications trade legislation as soon as possible, even before it acts on other trade issues. The bill, which will be considered by the full committee this month, also was endorsed by the Computer and Business Equipment Manufacturers Association.

Facing a complex trip through Congress

But the trade legislation is facing an unusually complex trip through the Congress, partly because of the turf battle between the U.S. House of Representatives Energy and Commerce Committee and the Ways and Means Committee over matters of trade.

The commerce committee approved the so-called Wirth-Florio telecommunications trade bill last November and sent it to the Ways and Means Committee for action. However, the latter committee replaced it with the Matsui-Gregg bill, so it is possible that both bills — or a compromise — will reach the House floor.

The key differences between the two are that the Wirth-Florio bill would put trade enforcement in the hands of the Federal Communications Commission and would give the president less discretion in solving trade disputes.

In another complicating development, the Ways and Means Committee plans to include the Matsui-Gregg bill in its big package of trade legislation headed for the House floor next month, thus putting the telecommunications bill on what insiders call a dual track.



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COMPUTER INDUSTRY

CBEMA executive highlights computer industry's legal issues

International laws especially nettlesome

By Eddy Goldberg

BOSTON — As computer use becomes more widespread, legal issues, some with no precedent, are becoming more important to users and manufacturers alike. And those legal questions could have multimillion-dollar repercussions down the road, according to Otis Smoot, executive vice-president of the Computer and Business Equipment Manufacturers Association (CBEMA).

Smoot highlighted the issues CBEMA is tracking during a recent

speech at the New England Computer Law Forum's monthly luncheon in Boston. Beyond patents, copyrights, software piracy and the sticky issue of intellectual property rights, Smoot said transnational agreements and international law are especially nettlesome when it comes to hammering out and enforcing detailed trade agreements.

Intellectual property rights have become a big issue in Washington, D.C., "after years of being an eye glazer, second only to standards," Smoot explained. "That's the people who can't even agree intellectual property that think it will save the country."

Smoot said a current investigation

by the U.S. Trade Representative concerning copyright violations in South Korea will likely set a precedent for intellectual property law in other newly industrialized Southeast Asian countries, notably Singapore. One problem area is that copyrights for software may come under a nation's own law, rather than under one comprehensive copyright law, weakening protection for U.S. firms.

Another government trade investigation concerns Brazil's Informatics Law, which promotes the Brazilian computer industry by demanding prioritizing the use of computers and related components. Smoot said there is some talk about the law being extended to telecommunications

tions and that there may be further restrictive changes in copyright protection for computer software. He said that he expects negotiations with Brazil to be long and difficult.

Smoot said an interesting government proposal to speed export licensing is the concept of what he called a "gold card." Under this plan, overseas customers that are known to be reliable would have special status to expedite licensing. Today, no matter how many shipments are approved to the same customer, each is treated as if it were the first. Otherwise, U.S. export controls are said to give international competitors an unfair trading advantage, since overseas vendors have more freedom to export.

Morris prospers in PC retail mart

From page 99

While Morris Decision Systems traditionally has shined at large customers, Morris says the firm is trying to migrate downward to smaller accounts.

"The large accounts have been the best covered; they're the easiest ones to see," Morris explains. "Frankly, we're attempting to go where the competition isn't so virulent. Why go get your face punched in all the time?"

Middle market accounts, which he defined as medium-size firms and au-

tonomous divisions of large corporations, seem particularly promising as IBM shifts its direct-sale tactics.

"IBM's coverage of the old National Marketing Division accounts is diminishing, so IBM is creating a vacuum for us," he says. "If the corporate account is not a prospect for a warm-cooked computer, then there's a high likelihood that IBM's coverage will be eroding."

IBM pricing policies affect others.

Morris also says he expects to change IBM pricing policies to affect his business. "My understanding is that they deepened the discounts for large volumes and made the discount more shallow for smaller volumes, and the goal was to use the pricing mechanism to drive dealers into other areas. And that drives us into the old National Marketing Division accounts. I love it!"

In very large accounts, such a move also "gives dealers a big incentive to sell non-IBM products," Morris notes wryly.

Resellers can recite a long litany of frustrations with IBM, but Morris says he believes theirs are slowly changing.

"IBM can be phenomenally rigid, but they're coming around," he says. "They're beginning to recognize that we're not their customers, we're their sales force. And like any sales force, we'll be successful if we are highly motivated, well trained and well compensated."

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COMPUTER INDUSTRY

Cadram files suit over CAD/CAM copyright infringement

Adage, Adra claim features are generic

By Stanley Gibson

BURBANK, Calif. — Alleging a variety of offenses including copyright infringement, computer-aided design software vendor Cadram, Inc. has filed a \$10 million law-

suit against two Massachusetts companies.

The suit charges Adage, Inc. of Billerica, Mass., and Adra Systems, Inc. of Lowell, Mass., with copyright infringement, trade secret misappropriation, trade dress infringement and other offenses.

Adra and Adage have each filed counterclaims against Ca-

dam, claiming that Cadram intends to use its complaint to monopolize the marketplace for computer-aided design and manufacturing workstation software.

Cadram claims that the Cadra I package, produced by Adra and sold by Adage under an exclusive marketing agreement, was created specifically to imitate Cadram's

CAD/CAM software.

Cadra I runs on the Adage II 50, a stand-alone CAD/CAM workstation introduced about 18 months ago. Cadram is a CAD/CAM software package that IBM sells with mainframe and workstation configurations, although IBM recently began marketing a Cadram-developed package called Professional Cadram to

run on its stand-alone RT Personal Computer.

'How could they lose income?'

"Cadram had no competing product for 18 months, so how could they lose income?" asked Adra President William T. Mason. He said Cadram did not file its suit until shortly before IBM was to announce that its RT PC workstation would run Cadram software, at which time Cadram came into direct competition with the Adage II 50 in the workstation market.

At the heart of the suit is whether features of CAD/CAM programs such as Cadram's are proprietary or generic.

Spreadsheets, such as Lotus Development Corp.'s 1-2-3 and Visicalc, are generally considered generic and not able to be copyrighted. Adage and Adra claim the Cadra I package contains features that are as generic as the spreadsheet, but Cadram claims its package has unique features that are covered by copyright laws.

"I don't think anyone could ever win a case on a spreadsheet," according to Jack Russo of the Palo Alto, Calif., law firm of Wilson and Russo, legal counsel for Cadram.

"If Cadra did not adopt the audiovisual display, we would say there would be no problem," he added, explaining that the look and feel of Cadram is its distinguishing feature and ought to be legally protected.

'A very novel legal theory'

"It's a very novel legal theory that Cadram is pursuing — that Adage has copied the trade dress, without copying how the Cadram program works," said Charles Foundryer, president of Daratech, Inc., a Cambridge, Mass., market research firm, who has been following the case.

Cadram's Russo conceded that the \$10 million being sought in punitive damages could probably not be awarded without Adage going into bankruptcy and said that Cadram is willing to be flexible in agreeing to a possible settlement.

"There have been overtures of a settlement," Russo said.

"If they [Adage] are agreeable, if [the case] could be tried quickly," Russo continued. But Adage indicated it does not expect a rapid solution. "We feel this suit is going to be in court for many years," said Richard A. Ames, Adage's controller.

Adage recently completed the acquisition of Lexidata Corp., a Billerica maker of graphics processors and subsystems for the OEM marketplace.

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Keynote address ballyhoo at OAC

From page 126

hour address in which he claimed only his way was the right way in dealing with office automation, and no other way existed.

He started out by making a reference to the rodeo show that had just left the Astrodome. "All the bull has left," he said, but he was wrong. Minute after minute he expounded on how only IBM and closely compatible (that is, Compaq) systems will be part of the office of the future.

"There is no possible alternative," to the IBM/Compaq office, he said.

Minicomputer and mainframe office systems are limited, monolithic and centralized, requiring users to change the way they do things, he said, as if his solution made no such requirements. Other micro vendors are not as truly IBM compatible as Compaq is, he added.

Cost is not a barrier to micro-based solutions as it is with other solutions, Canion stated. In his view, systems from other personal computer vendors — especially any system based on other-than-Intel Corp. chips — do not adhere to standards and are therefore useless in the future office.

Computer industry section begins on page 126.

In fact, Canion said, IBM's reduced instruction set RT Personal Computer and anything based on Motorola, Inc. 68000 chips are "dead-end streets." He mentioned the terms "industry standard" and "standards" close to 75 times, making sure that the audience knew he meant that Compaq, and not some of the other IBM clones, has met the standard.

"Knowing that IBM standard PCs will drive OAC makes investment safe for users," Canion said. "Make sure your purchase is based on the IBM industry standard. . . . The industry standard optimizes human resources. . . . People are more fulfilled and creative in the organization. It is the most important aspect in the history of OAC evolution." On and on and on. And only Compaq was truly compatible with IBM's standard, he said.

In this industry, MIS managers know that standards are important. They all know that when IBM released its Personal Computer five years ago, it clearly set a standard. And Canion, as he had a right to do, did outline some very good reasons for going with the standard.

He gave an interesting and probably accurate scenario for the future of PC-based OAC. From stand-alone systems that offered assistance in office tasks, micros are moving toward interconnection, allowing file transfer, electronic mail and access to data bases and peripherals.

He predicted that the future will include networked, sophisticated applications — previously only possible on larger systems — and the complete integration of the PC into a corporate information system. Granted, it is important for DP managers to hear Canion's version of the future — but not his hard sell.

Try to tell the throngs looking at desktop publishing around the Apple

Computer, Inc. booth that IBM's way is the only way to go in the office and that Apple computers are dead end because they don't rely on Intel, and you will get some serious disagreement. And what kind of arrogance lets Rod Canion espouse his system as the only worthwhile OAC system, while Compaq did not even exhibit at the OAC?

Now, more than ever before, MIS managers are finding solutions from a number of vendors for particular OAC needs. And these people do not want to sit in front of Canion and hear that what they are doing is wrong, or short-sighted or not justifiable because it is not IBM or Compaq.

"It was a long ad that I paid a lot of money to hear," said a DP manager from a Midwestern gas and electric utility.

Amen.

Daisy lawsuits to be consolidated

By **Maureen McInerney**
SAN JOSE, Calif.

U.S. District Court Judge William Ingram is soon expected to consolidate several class action suits filed against workstation manufacturer Daisy Systems Corp. by its shareholders.

Since March at least eight suits have been filed against both Daisy and its executives, charging the company with misrepresenting its financial condition from the time it went public in November 1984.

In February, Daisy laid off 100 of its 1,000 employees in anticipation of significantly lower sales during the second quarter ended March 31. Sales for the first quarter ended Dec. 31 were \$36.5 million. Daisy's stock price has fallen from an all-time high

of \$37 per share in March 1986 to a low of \$10 last month.

Attorney Richard Greenfield, whose Haverford, Pa.-based firm filed one of the class actions suits, said the cases charge Daisy executives with withholding information from the public about the firm's performance. Other suits point to the fact that Daisy executives, including President Aryeh Pinegold, sold 875,000 Daisy shares since November 1985.

Greenfield estimated that approximately 1,745 shareholders own the 17.5 million shares of outstanding Daisy stock. "We've gotten calls from shareholders all over the country who want to participate in the suit," Greenfield said.

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COMPUTER INDUSTRY

Texas Instruments to spur growth with high-end mini, AI

But analysts doubt turnaround this year

By James A. Martin

AUSTIN, Texas — Following a year of cutbacks, sluggish sales and disabling losses, the data systems group of Texas Instruments, Inc. is hoping for positive growth in 1986 and beyond with the help of a new high-end series of Unix-based minicomputers and the development of artificial intelligence applications for commercial and small business environments.

Industry observers, however, are guarded at best about the company's

changes for a turnaround this year or next. "It is difficult to see TI's data systems group carving out a large niche or outperforming the industry because of its small position in the mini and micro markets," says Michael Gumpert, securities analyst for Dean Witter Reynolds, Inc. in New York. "But I think that with their focus on cost controls and maintaining existing markets they will go from a shrinking to a stable business."

Diversified within the industry, TI faced various rates of decline in its semiconductor, geophysical exploration

and data systems sectors in 1985, and, as a consequence, was hit harder than most when the industry shakeout came. In calendar year 1985, TI's net losses were \$118.7 million, compared with profits of \$316 million the year earlier. Worldwide employment shrunk from 86,863 in late 1984 to 77,872 one year later.



T. Walden C. Rhines

The data systems group moved to cut \$70 million in annual operating expenses by consolidating engineering, manufacturing and marketing operations from four locations to two.

"We made reductions because we

had a much higher overhead than we needed or wanted," says data systems group President Walden C. Rhines. "It's a downturn like that, you get in a situation where you need to make some changes," he adds.

Rhines is optimistic about 1986 and says that TI and its data systems group are on the mend. "The whole economy in the computer market is back in a growth phase, with the fourth quarter up for most companies and the semiconductor recovery beginning to get under way," he says.

The data systems group introduced several new products in 1986 that should help strengthen its position in 1986, Rhines says. These ranged from the low-end Business System 100, a microcomputer offering users software availability on both DX10 and MicroSoft Corp.'s MS-DOS operating systems, to the Explorer, a 32-bit LISP-based workstation.

Micro line extension fills void

TI recently extended its minicomputer line with the introduction of its Business System 1500 [CW, March 24]. The 1500 is a series of 32-bit multiprocessor minicomputers that offer an enhanced Unix operating system supporting up to 128 users. "The 1500 will help fill a principal void we've had with customers in that it takes them well beyond the capacity for 100 users," Rhines says.

But some observers question whether new products are enough to reverse TI's computer fortunes. "Texas Instruments is a rather inwardly focused organization, leading them to develop some products they considered interesting instead of having close ties to their customer base as the source of new product ideas," says Stuart Johnson, vice-president of research for Wertheim and Co. in New York.

TI pins much of its future hope on artificial intelligence technology, which is a "massive corporate commitment," according to Rhines. "Artificial intelligence is a very performance-sensitive market, and there is a lot of competition to get the fastest machine the soonest," Rhines says. The data systems and semiconductor sectors have been jointly developing a single 32-bit AI microprocessor chip to achieve that goal. Although still in the prototype stage, Rhines says AI chip technology "will give us a significant performance advantage over all our competitors by having an integrated chip while everyone else has a processor board."

It has been developing symbolic processing technology since 1975, and Rhines says he believes it can be the direction that integrates a great deal of TI's development work. "We are looking to merge the small business minicomputer with artificial intelligence processors," Rhines says. Just how fast AI can boost TI's sales is a matter of debate. "I think their emphasis on artificial intelligence is a good idea, but it won't be enough to offset the sluggishness of the minicomputer market for now," says Dean Witter's Gumpert.

Skeptics aside, Rhines says he is confident that the data systems group is making the right moves. "Everything is looking toward more positive growth in 1986 and improved profitability."

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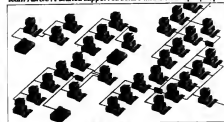
The XC24 System uses a coaxial cable that can easily run along the base of office walls or in ceilings. And it's an entry-level option utilizing the same industry standard MS-DOS® operating system as does the XC22. The XC24 is also user installable, easy to learn and use.

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contain powerful departmental processing options such as sophisticated relational

data-base management, host program access, electronic mail and high capacity file, disk and print services which enable each application to fulfill complete purchasing or financial needs. Xerox is also introducing the 4020 Color Ink Jet Printer, which is also network compatible. The 4020 can produce up to 4000 shades of seven primary colors. And finally Xerox is introducing the Telecopier 7000. A portable digital facsimile transceiver that can transmit a hand written or typed page in just 25 seconds. Before we leave we'd like to remind you of Team Xerox. A unified support structure that includes people, products and services. All here to help you every step of the way.



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Nora Feldman Gildea
Director of Marketing
IDEAssociates, Inc.
Billerica, MA



IDEAssociates, developer and marketer of IBM PC peripherals and a company with 500% growth during its last fiscal year, first started using Computerworld to reach a selected audience (MIS/DP) with a narrow segment of their product line (LANs and micro-to-mainframe and micro-to-mini communications links). But as the responses started coming in, Nora Feldman Gildea, Director of Marketing, found that Computerworld attracted much more than just MIS/DP professionals.

"We immediately increased our advertising to include our full product line — boards, mo-



dems, graphics, mass storage, networks — everything. The responses are coming from Computerworld readers in all six of our audiences: the PC end user, the business manager, the retailer, the OEM and VAR side of the market, and, of course, the MIS/DP executive."

"Each time we submitted our lead tracking system, Computerworld kept coming out on top in the MIS/DP market. In the 800 response, it tallied the most calls. And on our warranty cards in an unsolicited readership question, Computerworld was mentioned most often."

As Nora confirms, "The numbers are in. Computerworld



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COMPUTER INDUSTRY

Ireland, Netherlands court U.S. high-tech investments

Firms plied with financial incentives

By Edward Warner
Computerworld News Service

The Netherlands is relatively wealthy, while Ireland has the highest unemployment in Europe. The Netherlands has several major homegrown industries, including Shell Oil Co., while less than half of Ireland's gross national product comes from industry. But despite their differences, the two nations have one thing in common: They're both in hot pursuit of U.S. high-technology investment.

When a U.S. firm opens a plant or European distribution center in a foreign nation, the country gets a new source of jobs and tax revenue. It also gets a chance to lay the groundwork for its own high-technology industries.

"There was no electronics industry in Ireland 15 years ago," according to P. J. Daly, director of international services for Ireland's Industrial Development Authority (IDA).

Representatives of the IDA and its Dutch equivalent, the Industrial Commission of the Netherlands (ICN), visited the U.S. last month to promote their respective nations as the best location for the European branch of a U.S. high-tech business.

Pitch for high-tech investment

The Netherlands made its pitch to gain U.S. high-tech investment during a one-day ICN conference in Lowell, Mass. Approximately 150 attendees, most of them computer and biotechnology industry executives, heard Netherlands Ambassador to the U.S. Richard H. Fein and other Dutch officials promote the Netherlands as a centrally located European nation with a stable political climate and currency and "one of the world's most open markets."

But there is a downside to planting roots in the Netherlands, according to an executive from one of the more than 1,000 U.S. firms with subsidiaries in the Netherlands. Hubert J. P. Shoemaker, president of Centocor, Inc., a Malvern, Pa., biotechnology company, says that general managers are hard to find in the Netherlands.

Shoemaker says that Dutch executives are used to getting all their pay guaranteed up front and distrust the relatively lower pay of U.S. firms, even when the pay package is laced with stock incentives and bonus plans.

To lure foreign business to their soil, the Dutch offer a

host of government-sponsored financial incentives, including funding 45% of the cost of some joint research and development efforts. The Dutch government also pays newcomers 12.5% to 35% of the cost of the buildings and equipment they need to set up shop in the Netherlands.

Though the Irish government also offers financial in-

centives, Daly says Ireland's greatest payoff comes from the fact that, though the nation has a wealth of skilled technical talent, its labor costs are 80% less than the in the U.S.

Indeed, few places other than Ireland can boast a "high proportion of unemployment among software programmers," he adds.

The surplus of programmers and laws that protect software firms from being taxed for more than 10% of their annual net Irish income, make Ireland ideal for software development, Daly claims.

Many of the big names in the U.S. computer industry — including Lotus Development Corp., Microsoft Corp.

and IBM — conduct software development in Ireland, even though some, including Lotus, have European headquarters elsewhere.

While acknowledging that its location and market size may be Ireland's biggest liabilities, Daly notes that everyone in Ireland conducts business — and writes software — in English.

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Announcing the 1986 Computerworld button contest!

Every year, as all you button freaks know, Computerworld distributes tens of thousands of buttons at trade shows around the country. For several years now, against our better judgement, we have been letting you, our readers, write these buttons. To our surprise, you have written some good ones (like those shown here). So, we're doing it again.

We're looking for a few good slogans — witty, relevant, SHORT (these are small buttons), and at least moderately clean. You may send in your entries on the form below or a copy.

But you may NOT send us everything that comes into your head. Our offices aren't big enough to handle all that paper! Please take the time to narrow your ideas down to the two best you can come up with (test them on your friends).

All entries will be shown to our panel of judges, who will be tied to their chairs until selections are complete. Six winning slogans will be picked, and everyone who sent in one of those slogans will be eligible for a prize. If you are the only one to send in a winning slogan, you win the prize. If more than one person had the

same intelligent idea, we'll pick the prize winner out of a hat. Prize winners will receive a \$100 certificate good towards the purchase of software from a friendly neighborhood computer store.

All decisions of the judges will be final, and no representations as to their competence, skill, or sense of humor are being made. All entries will become the property of CW Communications/Inc. Deadline for entries is May 2, 1986 at our offices in Framingham, MA.

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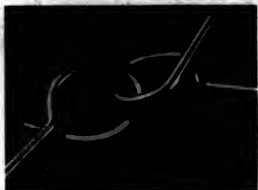
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COMPUTER INDUSTRY

Fresh start for humbled Encore

From page 126

Carnegie-Mellon University since October, with six more shipments planned for this month.

At the standard university price tag of 40% to 45% off list price, such sales will not translate into Encore profits.

Significant cutbacks on expense side

But Fisher said he hopes that with significant cutbacks on the expense side of the ledger, the company will hold out until its academic user base spurs sales into technology-intensive commercial accounts.

"It would be nice to have a mix of research and commercial users, and over time we'll get that," he said.

"The commercial marketplace is still cautious. Our market is like a bell curve and we're just starting with the 'innovator' users, who are only 2.5% of the market. As we go along the curve, we'll get the 'early adopters' in companies — the people who won't get in trouble by not going with IBM or DEC," Fisher explained.

Multimax goes beyond scientific merit

Although Encore's most common head-to-head competition in benchmark tests has been Sequent Computer Corp., Fisher said that Multimax applications go well beyond the increasingly crowded scientific/engineering market.

He claimed that a wide variety of data and transaction processing

tasks can be parallelized for better performance on up to 20 Multimax processors. "Ours is a general-purpose architecture," he said.

Cutting staff, expenses

Encore has already eliminated 85 of its 240 employees and will cut another 25 by attrition before the end of October, Fisher said.

Although research and development spending for Multimax and the Annex communications front-end controller continues at previous levels, Encore has discontinued its development of workstations and fourth-generation languages.

Instead, Encore will encourage third-party software developers to write Unix-based applications for Multimax, Fisher added.

"We're taking the company back to start-up levels," he said.

Of course, Encore was no ordinary start-up, but with the recent departures of its two other cofounders, former DEC Engineering

Vice-President C. Gordon Bell and DG cofounder Henry Burkhardt III, the company now looks much more like many other fledgling hardware firms.

"It isn't so unusual that the partners in a start-up disagree," Fisher said.

"But the expectations for Encore were so high that our disagreements were well publicized," he added.

Last week, Encore introduced a 128M-byte memory subsystem for the Multimax and an Encore version of AT&T's Unix System V. The company also announced a new protocol on offloads to save editing tasks from the host to the Annex terminal server.

Prime is expected to introduce a number of products within the next few weeks, including a mid-range and dual processor. The products could serve to stimulate the firm's order rate and improve second-half results.

"It's going to help revenues grow, but not that much," said E. F. Hutton's Gera. "Any firm looking for volume-driven revenue growth vs. cost-driven growth is probably going to be disappointed."

Prime's Gavaghan said that since the firm's problem appears to be a result of weak capital spending on the part of end users, product introductions may not prove to be a remedy. "We're not sure if customers are not spending money because they are waiting for replacement products," the Prime spokesman said. "The question is, Will new products change that?"

Analysts were unsure last week whether the first-quarter results would cause Prime not to meet its fiscal 1986 profit and revenue objectives.

L. F. Rothschild's Cohen, however, offered an optimistic prognosis. "They're a well-managed company, and if they meet their product announcement dates, I suspect results will come back and maybe even exceed plan," he said.

After poor showing, analysts caution, 'Don't pick Daisy'

ACTIVE ISSUES



Kathy Porteus

Usually when a stock gets hammered, as did Daisy Systems Corp. (DAZY — 11%) in late February, contrarian investors take notice. Yet in Daisy's case, many investors attracted to out-of-favor stocks choose to stay clear of this turnkey computer-aided engineering (CAE) company.

After Daisy announced it expected a significant loss for the quarter ended March 31, its stock plunged over 35% and has not budged despite great advances in the overall market.

Hurting Daisy's stock more than its expected quarterly loss, according to Laura Conigliaro, vice-president with Prudential-Bache Securities, is the company's substantial loss of credibility that will likely be difficult to rebuild. In addition, there is "an awful lot of technical and product-related issues Daisy must deal with," Conigliaro says.

According to Bruce Johnston, research analyst with First Boston Co., weak fundamentals still nag the CAE industry. First, "there are too many players searching for too few dollars," Johnston says. Second, the plunge in hardware prices means "a CAE company must run very hard just to stay in place."

Because CAE companies such as Daisy and Mentor Graphics Corp. (MENT — 15) have historically traded on their fundamentals, Johnston adds, "it would be unwise for investors to look at the future performance of these stocks relative to the broad market."

Although analysts agree that

Porteus is president of Strand Research Associates, a Centerville, Mass.-based company that provides customized research services for financial and high-tech firms.

Daisy is not attractive at its current price level, earnings-per-share estimates for Daisy's fiscal year ending Sept. 30 cover a wide range. Johnston estimates Daisy will report between break even and losing 10 cents a share. Peter D. Schleider, analyst with L. F. Rothschild, Unterberg Towbin, wrote in a recent report that he expects Daisy to break even or earn up to 20 cents a share in fiscal 1986. Most optimistic is Peter E. Heymann, research analyst with Drexel Burnham Lambert, Inc., who estimates Daisy will earn 55 cents a share.

Even this disparity in earnings expectations are differing analysts' opinions as to when Daisy will begin shipping new products such as its Boardmaster printed-circuit board design and layout system and its announced product based on Digital Equipment Corp. Microvax II.

Drexel's Heymann says that "there is a reasonable probability of a rebound in Daisy's stock, yet at this time Daisy is suitable only for extremely risk-prone investors."

Heymann suggests interested investors take the next few months, when Daisy's stock is not likely to move, to judge the company's handling of its fundamental problems.

Meanwhile, analysts expect Mentor will pick up some of Daisy's lost momentum. Mentor should benefit from products based on Apollo Computer, Inc.'s recently introduced DN3000 line, although Mentor's future hardware strategy is less certain. Also, Mentor's expenses are back in line with revenue, making improvements possible.

Most analysts estimate Mentor will earn 70 cents a share in fiscal 1986 ending Dec. 31. "While this represents a nice, credible jump over fiscal 1985 earnings of 52 cents a share," Conigliaro says, "it is still not going to be an easy number for Mentor to reach."

According to Conigliaro, Mentor becomes attractive for a long-term investment, not for investors looking for stocks that will move with today's roaring bull market.

Belated slump strikes Prime

From page 126

products, was particularly effective in Europe, where business remained strong until recently, analysts have noted.

"I think that they are one of the strongest, they were one of the last to get hurt," noted Frederic Cohen, who follows the company for L. F. Rothschild, Unterberg Towbin. "The weakness in orders has gotten more pronounced recently, and they eventually stumbled as well."

Firm reassesses 1986 operating plan

In a prepared statement, Prime President and Chief Executive Officer Joe M. Henson said that in view of the continued uncertainty and sluggish growth of the industry, the firm is reassessing its 1986 operating plan and is limiting its investments and hirings to key strategic areas.

Prime spokesman Joseph Gavaghan said those areas included adding sales representatives as business warrants, maintaining research and development expenditures at 11% of 1985 revenue and continuing emphasis on the CAD/CAM market.

IBM announces plans to separate World Trade Americas/Far East

By Alan Aizer

ARMONK, N.Y. — IBM last week said it will split its World Trade Americas/Far East Corp. (AFE) into two groups effective July 1, with one serving Asia and Australia and the other handling Canada and Latin America.

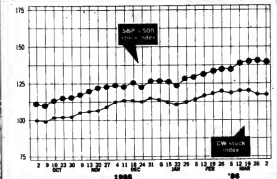
The realignment, IBM said, is an outgrowth of AFE's strategy of decentralizing its operations under retiring Senior Vice President Ralph A. Pfeiffer, who chairs AFE and the World Trade Group to which it reports. Pfeiffer, who remains World Trade chairman during the transitional phase, is retiring after 37 years of service with IBM.

IBM World Trade Americas Group, headquartered in Tokyo and Mount Pleasant, N.Y., will be responsible for the company's operations in Canada and Latin America. David E. McKinney, IBM vice-president and AFE president, is group executive of the organization. Effective July 1, he will become a member of IBM's Corporate Management Board.

IBM World Trade Asia/Pacific Group also has headquarters in Tokyo and Mount Pleasant, will oversee IBM's operations in the Far East. Heading the group will be George H. Conrades, who also will become a member of the Corporate Management board on July 1.

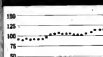
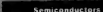
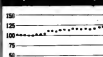
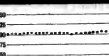
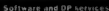
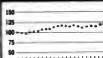
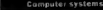
COMPUTER INDUSTRY

Computerworld stock trading index



All indexes reflect a basket of base of 100 on Nov. 31, 1984, and show stock market performance in relation to that base. The CIO stock index represents the weighted average performance of the 46 companies of computer industry stocks.

	3/26/86	4/2/86
Computer systems	120.6	118.8
Software and DP services	105.0	104.2
Peripherals and subsystems	116.5	116.8
Supplies and accessories	152.3	160.1
Semiconductors	104.4	103.1
Leasing companies	103.8	103.9
CW stock index	118.9	118.5
Standard and Poor's 500 stock index	141.9	140.9



Computerworld stock trading summary

CLOSING PRICES WEDNESDAY, APRIL 2, 1986

[illegible]

EXCH: N=NEW YORK, A=AMERICAN, P=PACIFIC, B=BOSTON
I=INTERNATIONAL, M=MINNEAPOLIS, O=OVER-THE-COUNTER
O.T.C. PRICES ARE IN PRICES AS OF 3 P.M. ON LAST BID
() = NEAREST DOLLAR

Source: Trade Question, Inc.

COMPUTER INDUSTRY

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Texas Instruments' data systems group looks for a better year/106

Investors are steering clear of Daisy Systems' stock/124

INSTANT ANALYSIS

"The IBM strategy is not Microsoft Corp. Xenix or Unix."

— Bill Entry Systems Division President William Lowe speaking last week to analysts

Belated slump hits Prime

Sluggish demand accounts for 25% drop in earnings

By Alan Japer
NATICK, Mass. — Prime Computer, Inc., which had outperformed many of its minicomputer competitors over the previous four quarters, last week disclosed that the industry-wide downturn had finally affected its bottom line.

Prime said earnings for the first fiscal quarter of 1986 would be 25% below the comparable period last year due to sluggish domestic and international demand for its products and the firm's desire to continue investments in key strategic areas. Prime earned \$11.8 million, or 25 cents a share, in the first quarter last year.

In addition, the company said revenue for the first quarter, which ended March 31, is expected to be 10% to 15% above the \$175.8 million registered in the comparable period last year, a figure well below the 20% increase to \$210 million projected

earlier (CW, March 24).

E. F. Hutton & Co. analyst Michael Geran noted that Prime structured its business and budgeted expenditures at a level higher than the revenue realized. "Fourteen percent revenue growth is good given the current business environment, but when you budget for 20% growth you have a problem," he concluded.

Prime is belatedly suffering from weaker than expected capital expenditures by end users that has caused grief for many other computer makers, including IBM, Burroughs Corp. and Data General Corp., analysts said. Approximately 85% of the firm's revenue results from end-user sales, with the remaining 15% provided by a mix of third-party resellers.

Prime had weathered the industry-wide downturn of the last 18 months by successfully penetrating high-growth vertical markets within the computer-aided design and manufacturing (CAD/CAM) marketplace. Its strategy, predicated on marketing a broad line of aggressively priced

See BELATED page 124

Fresh start for humbled Encore

By Clinton Winder
MARLBORO, Mass. — Humility was not a quality often found in the computer industry in the heady days of 1983. So when three of the greatest minds behind Prime Computer, Inc., Digital Equipment Corp. and Data General Corp. joined forces at superminicomputer start-up Encore Computer Corp., hopes and hype were at a feverish level.

Now, after three years of development delays, discontinued products, layoffs, well-publicized management defections and virtually no product revenue, a slummed-down Encore is multibillionarily chastened. It has targeted the university and government research market for initial sales of its Multimax supermini, and Encore Chairman

and former Prime Chief Executive Kenneth G. Fisher will not predict when the company will be profitable.



Encore's Chairman Fisher

"We're taking a very low-key, humble approach," Fisher said in an interview last week at Encore's new Marlboro headquarters. "Too much has been speculated on; we want to focus on what's real. I could sit here all day and talk about our product, but it's meaningless without orders."

Orders were something Encore was sorely lacking until its recent concentration in the academic market.

Fisher claimed that seven Multimax machines have been shipped to customers such as Argonne National Laboratory and

See FRESH page 124



INDUSTRY INSIGHT
Donna Ramona

Keynote ballyhoo

The keynote address is to an industry conference what a sermon is to a religious service. One attends this speech expecting to discover answers to problems, news of the state of the art and guides to the future.

So when a keynote speaker abuses his position to shill for his company, many people in the audience feel angry, victimized and ripped off. Such was the case with Compaq Computer Corp. President and Chief Executive Officer Rod Canion at the recent Office Automation Conference (OAC) in Houston's Astorhall.

Conferences and exhibitions can serve a healthy purpose for the MIS manager. Or so they should. Crowds freshly arrived in town at great expense to their companies — jam the keynote room waiting for the speaker to illuminate the event and stoke up their interest in the conference subject.

Admittedly, showgoers have become accustomed to conference sessions or seminars that outline a particular vendor's products or philosophies. It is getting easier to spot such sessions and attend them only if one wants to know about that vendor or to stay away from them if one wants to get a broader view.

But we should not allow conference promoters to get away with making us a captive audience for a slanted keynote speaker, which was the case at OAC. Canion gave a self-serving half-

See KEYNOTE page 104

Raymond is a Computerworld senior writer covering the computer industry.

Industry pushes for telecommunications trade legislation

Congress reviews bills to open foreign markets to U.S. vendors' exports

By Mitch Betts
WASHINGTON, D.C. — If the U.S. Congress keeps to its present pace, it may enact telecommunications trade legislation by mid-summer, which industry lobbyists said would be none too soon.

The goal of the legislative effort is to open foreign marketplaces, notably Japan and Europe, to exports of U.S. telecommunications equipment. The U.S. trade deficit in that industry increased 4% to \$1.3 billion in 1985.

"The telecommunications trade problem is a time-sensitive matter," Joseph C. Culp, president of Rock-

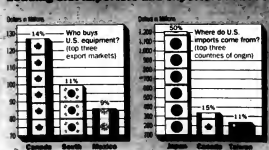
well International Corp.'s Telecommunications Group, recently told a congressional panel. He explained that, with product life cycles as short as two or three years, the industry needs quick action on legislation that fosters open markets for these products.

The latest congressional step was taken by the U.S. House of Representatives' Subcommittee on Trade. The panel, part of the Ways and Means Committee, recently approved a telecommunications trade bill sponsored by Reps. Robert T. Matsui (D-Calif.) and Judd Gregg (R-N.H.) that was designed to combat foreign protectionism.

The Matsui-Gregg bill requires the president to negotiate trade agreements that remove foreign barriers to U.S. products and services. If the negotiations fail, the president is re-

See INDUSTRY page 100

Telecommunications equipment: Leading U.S. importers and exporters in 1985



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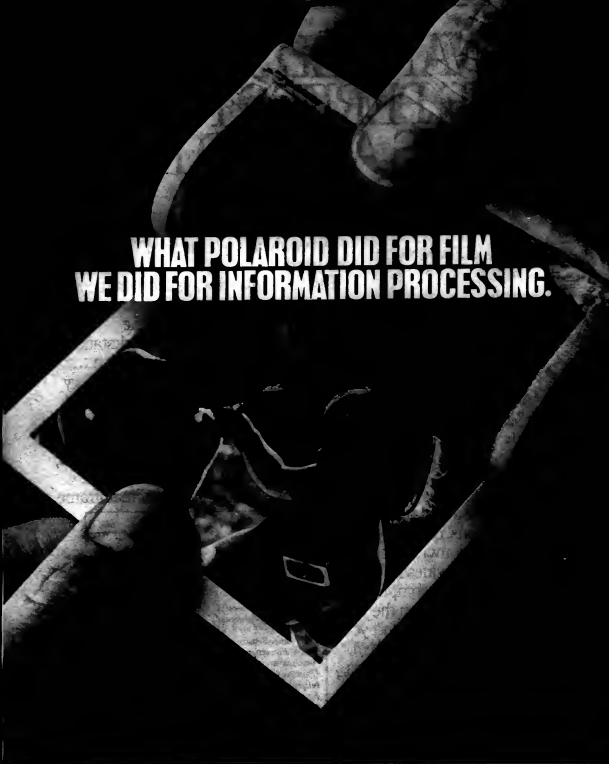
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